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# Minnesota Medicine

Journal of the Minnesota State Medical Association

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## ORIGINAL ARTICLES

### THE PROBLEM OF HUMIDITY INDOORS.\*

E. P. LYON,

Professor of Physiology, University of Minnesota.  
Minneapolis, Minn.

The air is usually described as a mixture of three gases. Really there are four, nitrogen, oxygen, carbon dioxide and water vapor. While all may vary, relatively or actually, the proportion of water vapor varies far more than any of the others.

When at any given temperature the air contains as much vapor as possible the air is "saturated." Table I shows the weight of water in saturated air of various temperatures. Note that at 70° F. the capacity of the air for water is sixteen times as great as at 0° F. and seven times as great as at the freezing point.

TABLE I

#### PER CENT HUMIDITY NOT ALLOWING FOR EXPANSION

Grains per cu ft.	0°	10°	20°	30°	40°	50°	60°	70°	80°
.5	100%	45%	33%	23%	16%	12%	9%	6%	4%
1.1		100	70	50	36	26	19	14	10
1.5			100	68	50	35	26	19	14
2.19				100	70	50	38	27	20
3.06					100	72	53	40	29
4.24						100	73	53	40
5.82							100	73	54
7.94								100	74
10.73									100

It is evident that if saturated air at 0° is raised to 70° F., 7.5 grains of water must be

added to each cubic foot in order to saturate the air under the new temperature. Or looking at the matter in another way, if air saturated at 0° were raised to 70° F. without addition of water this air would then be only 6% saturated.

Every intermediate degree between 0° and 100% of saturation is possible at each temperature. Hence the idea of relative humidity or percentage of saturation. This is the quantity obtained by the dew point or by the rate of evaporation test. It is valuable for certain considerations, particularly when temperature does not change. But the relative humidity changes with temperature, as has been indicated. I am therefore tentatively suggesting the term mass humidity to indicate the total quantity of water per cubic foot of air.

Since the absolute zero Fahrenheit is minus 459°, on the absolute scale our climatic fluctuations of temperature would be about 25%. The atmospheric pressure varies a few percent at any one point and perhaps 30% among the habitable localities. The variation of N<sub>2</sub> is negligible and of O<sub>2</sub> and CO<sub>2</sub> even including our closed houses is small. But the water vapor may be hundreds of times greater at some times and places than at others.

The human mechanism stands these variations well and probably there is no optimum humidity *per se*. Probably, however, there is an optimum humidity for each temperature. No one knows exactly what it is. Our first problem if we are to modify humidity artificially is to decide upon some sort of standard.

The whole question is intimately related to the loss of heat from the body. We must lose heat as fast as we produce it; otherwise the temperature of our body would rise.

The various forms of heat loss are represented in table II.

\*Read at the Annual Meeting of the Minnesota State Medical Association, Duluth, Aug. 29, 1918.

TABLE II.  
TOTAL HEAT LOSS

	Vierordt		Atwater Resting Man		Atwater Working Man	
	Cal.	%	Cal.	%	Cal.	%
Urine and feces..	47.5	1.8	31	1.4	26	.6
Warming Air ....	84.5	3.5				
Evapor. from lungs.	182	7.2	548	24.2	859	20.3
Evapor. from skin..	364	14.5				
Radia. and conduc..	1792	73	1683	74.4	3440	79.1
	2470	100%	2262	100%	4225	100%

\*Also did external work equivalent to 450 calories.

Note that the greatest loss under usual conditions is through radiation and conduction. The rate of this loss depends on the difference in temperature between the surface of the body and its surroundings.

The second method of heat loss in degree of importance at moderate temperatures, is evaporation. Evaporation is conditioned from the outside by the temperature of the air in contact with the body and the amount of water vapor already in this air. From the body side, evaporation is conditioned by the area of moist surface exposed. Such surface is exposed (a) in the air passages and lungs and (b) on the skin where sweat glands are located. The area in the lungs is varied somewhat with the depth and frequency of respiration as well as by the character of the air breathed. The 24 hour water loss through the lungs (plus skin of face) in different activities is thus given by Rubner:—at rest 408 grams: reading aloud 672 grams; singing 816 grams. However, the respiratory regulation of heat loss is by means as important in man as in the dog; (e. g., panting).

The automatic regulation of sweat is, on the contrary, an important part of our thermostatic control.

Now since the body obeys the thermodynamic laws, it cannot lose heat by radiation or conduction unless the surrounding air is cooler than the body. On a hot summer day radiation and conduction must sink into relative insignificance as factors in temperature regulation, although no exact data are available. In such weather we depend nearly wholly on evaporation for heat loss.

Similarly, in accord with inexorable physical law, we cannot evaporate water into air already saturated and of the temperature of the body. On a hot, humid day both our chief methods of

losing heat may largely fail. The body lowers heat production as much as possible. Nevertheless fever may result, with its discomforts and intoxications. You are likely to call the result "sun stroke".

It is plain therefore and supported by abundant physiological evidence that high temperature and high humidity together are unhygienic, even destructive.

At the other extreme, in our climate, conditions are quite different. At 0° F. it is impossible to have more than  $\frac{1}{2}$  grain of water vapor per cubic foot of air. The range of vapor content at 0° F. is so small that I do not believe we could differentiate between cold effects and humidity effects.

At intermediate temperatures conditions are still different. With a temperature of 40° F., say, there is a marked difference between the effect of saturated air and dry air. This is because the saturated air has now a considerable quantity of water, (see table I), and this increases markedly the rate of loss of heat by conduction from the body surface. This is by reason of the high specific heat of water.

At any temperature we evaporate and so lose heat faster into dry than into moist air, but around 40° or 50° F. the loss by conduction into moist air more than makes up for the decreased evaporation into such air. We see why humid days around 40° or 50° F. seem cold and why humidity can be either a heat preserving or a heat losing factor, depending on the temperature.

At higher temperatures the high rate of loss through conductivity does not prevail. On a May or June day around 70° F. and 70% relative humidity we take off some of our clothing and feel fine and comfortable.

The humidity standards in the hygienic and engineering textbooks are mere guesses and seem to be founded on moderate summer weather. 60% to 70% relative humidity is a frequent standard. These books were written by people living in more moderate climates than Minnesota in winter.

My experiments show that in zero weather it is not practicable to keep a 60% humidity in a building without double windows. Literally streams of water will condense on the glass and run down to the floor. Even with double windows one may get condensation on outside



walls and ruined wall paper. I have therefore come to the conclusion that 40% to 50% is as high a humidity as can satisfactorily be maintained in homes in this state in cold weather. If we accept this tentative standard, what does it mean as a practical problem?

Let us take a small house of say 10,000 cu. ft. capacity. From Table I it appears that each cubic foot of zero degree air will need 7.5 grains of water added to it to saturate it when it has been heated to 70° F., or about 4 grains to half saturate it. Calculation shows that about one gallon of water will be needed for the house of 10,000 cubic feet capacity and 50% saturation. This fact is perhaps startling to anyone when he first approaches this subject mathematically. Practically the problem would be of small significance if you could evaporate your one gallon of water into the air of your house and keep it there. But you can't. There is constant leakage and this is surprisingly large.

Experiments which I made three winters ago indicated that the air of my well built and wholly double-windowed house was renewed at least ten times a day in quiet weather. In engineering books twenty-four changes a day are usually assumed. Wind greatly increases the rate of exchange between outside and inside air.

Suppose we say that the air in our 10,000 foot house is renewed ten to fifteen times a day. We arrive at the startling fact that ten to fifteen gallons of water must be evaporated every twenty-four hours if we care to maintain even the moderate humidity this paper advocates. Of course what most people are actually doing is **nothing at all**, with the result that our houses and offices in winter are often drier than any desert on the face of the earth.

No quantitative physiological evidence as to the effects of dry air is at hand. I should like to get the opinion of those present from a clinical standpoint. Can you say, definitely, from clinical experience that the prevalence of respiratory troubles in winter is related to lack of humidity? Or might it be the high temperature maintained in American houses, itself, perhaps, partly attributable to lack of humidity?

We certainly live under artificial conditions. I believe they are bad. I believe (without present scientific evidence) that artificial humidification of dwelling houses, offices and other places where relatively few people gather is de-

sirable from the standpoint of comfort and perhaps is considerably protective from infection and from vaso motor strain.

If you accede even partially to this view, you will not begrudge a few moments devoted to the practical side of this question.

Do the ordinary home appliances meet the need? If you recall that 15 gallons of water are needed per day, you at once see that the little dish on the radiator is a delusion. The tea kettle on the kitchen stove may do pretty well for that room but has little effect on the house as a whole.

There are a good many devices on the market. Are these effective? Let us take up in succession the different types of heating.

For hot water radiators (also for steam) I know of the following humidifiers, all of which I have tested:<sup>1</sup>

TABLE III.

EVAPORATION PER LINEAR FOOT OF RADIATOR OCCUPIED.

	Gms. per 24 hrs.
"Speco," av. of 3 tests, zero weather.....	294
"Savo," av. of 3 tests, zero weather.....	230
"Buddington," av. 3 tests, zero weather,..	1,116
"Flobun," av. 2 tests, zero weather,.....	1,248

TABLE IV.

WATER EVAPORATION FROM LUNGS AND SKIN.

	Gms. per 24 hrs.
Resting man av. 13 expts. (Atwater).....	939
Working man av. 6 expts. (Atwater).....	1,912
70 students in laboratory, av. (Lyon).....	1,200

Compare tables III and IV. Note that the best of the market humidifiers for use on radiators evaporates about as much water as one person from his lungs and skin.

Imagine father spending his good money for one of these devices and sitting, with his feet on the radiator, in deep content that he is now doing the right thing for his family, while at the same time he and each of his progeny are humidifying the air more effectively than the "humidifier" and without costing him a cent! The truth is all these devices were made to sell and not to humidify. It would take over thirty of the best type to evaporate ten gallons a day.

<sup>1</sup>See Science, N. S., Vol. XLVI, p. 262, Sept 14, 1917.

There wouldn't be room for them on the radiators of our 10,000 cu. ft. house. Moreover these devices must be filled by hand. That is a bad defect in apparatus of this kind.

None of the manufacturers of these articles seems to have recognized the essential physical principles which are (a) large surface of water exposed to air, (b) rapid renewal of air over the surface of the water. The temperature within the limits set by radiator heating is of less importance in securing evaporation than either of the factors mentioned above. Depth of water is of no importance, yet several manufacturers have made their receptacles as deep as possible, (e. g. "Speco," "Savo").

Attacking the problem with the above principles in mind I have devised several types which are ten or more times as effective as anything on the market.

One of these shown in Fig. 1, consists of several trays, one above another, and so arranged that warm air rising from behind the radiator constantly passes between the trays

and over the water surface therein. Twelve trays as indicated in figure give ten square feet of water surface per linear foot of radiator occupied.

One of these apparatuses thirty inches long evaporated 3.7 gallons daily in my house last January. Four or five such humidifiers would be sufficient, in our house of 10,000 cubic feet, to meet our tentative requirement of 40-50% humidity.

But the apparatus is subject to two criticisms. (a) It is bulky and the ladies don't think it is pretty. (b) It has to be filled by hand. I put  $3\frac{1}{2}$  barrels of water into that one in my house during January last. Most people would balk at that. Of course it would be possible to pipe water and waste to each radiator and make the apparatus automatic.

I worked for a long time with drip systems.<sup>2</sup> They can be made very efficient but require a large amount of supervision.

Last winter I experimented with wick systems. The troubles with those humidifiers on

<sup>2</sup>Lyon: Heating and Ventilating Mag., Aug., 1917.

### RADIATOR HUMIDIFIER MADE UP OF WATER TRAYS

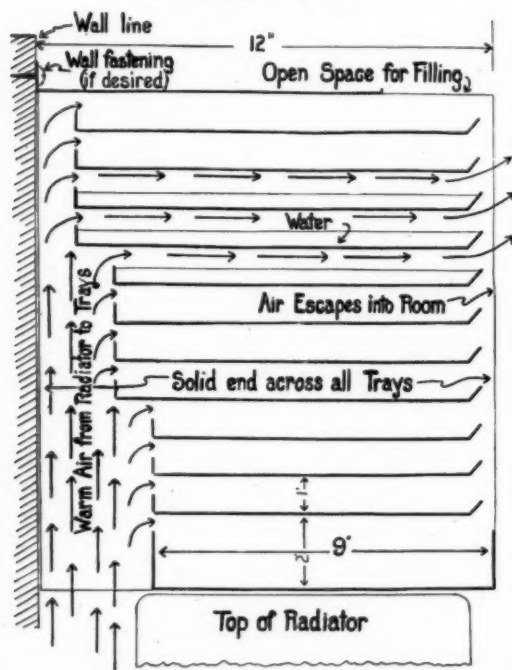


Fig. 1

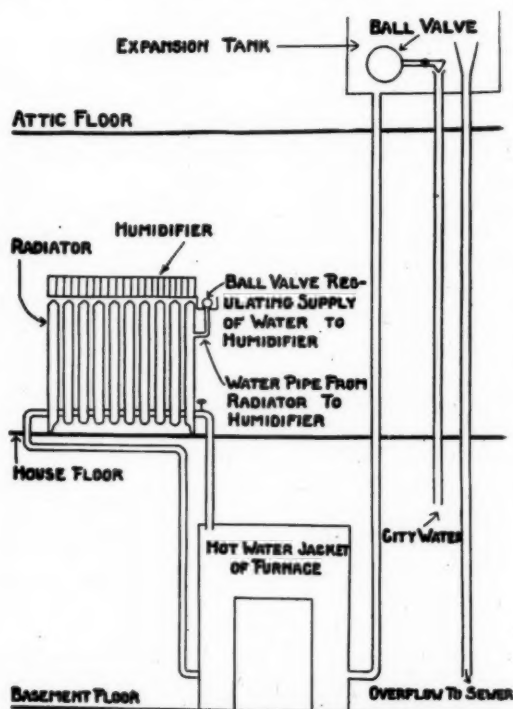


Fig. II

the market which use the wick system are (a) too little surface, (b) hand feeding, (c) clogging of wicks by deposits from water.

I have been able to greatly increase the surface by arranging close parallel troughs either across or lengthwise to the radiator. A sufficient evaporation is possible by this arrangement.

Automatic feeding I secured by the method shown in Fig. II. I had one such humidifier running for six weeks without touching it and estimate that it evaporated nearly a barrel of water a week.

So far as the third difficulty—namely, clogging of wicks—is concerned, I find it is less if the wicks are never permitted to get dry, as they are almost sure to do in any hand-fed system. I also find that cheap wick substance such as blotting paper and the heavy absorbent paper used by botanists as plant driers are just as good as the fancy wicks found in the apparatus sold in stores. These paper wicks can be used for a while and thrown away.

Unless a slightly, efficient, automatic humidifier for hot water systems can be worked out along the lines indicated, I believe that those who have hot water heating will have to fall back on accessory apparatus such as electric fans to aid evaporation, or special water boilers to put vapor into the air. Such apparatus has been patented but apparently has not proven a commercial success. It would surely be somewhat expensive. Remember you have to face all the time the necessity of evaporating one third to one half a barrel of water a day for an ordinary house.

So far as steam systems are concerned the problem seems easier. There are devices on the market for letting steam out noiselessly into the room. I have not tested any of these; but if large enough they ought to be efficient as moisteners. But engineers state that they are dangerous in that they lower the water level in the boiler and that no safe automatic boiler feed is known.

Another method used in steam systems is to provide steam coils to boil water in separate receptacles. This is free from the previous criticism and ought to be effective, provided said receptacles furnish sufficient free surface of water-air contact and also provided auto-

matic water supply to the humidifiers is arranged.

The older hot air furnaces often had a small water tank at the base of the air space. This was totally ineffective. I tested one that evaporated less than a quart a day.

Later types of furnaces have a tank above the fire box. These must be better, but the examples I have seen offer only a small water-air contact, and I should want an actual test before endorsing them.

Nevertheless if I were to put a heating system into a small house in Minnesota in the present state of development of hygiene and of heating engineering, I would choose a hot air furnace. I would have no outside air flue, but rather a cold return flue from every room to the base of the furnace. I would look to this system to secure circulation, which we now recognize as a very important hygienic factor. I would trust to leakage for renewal. I would have double windows, expecting even with these to have ample oxygen for an ordinary family. I would supply moisture by a sufficient number of broad shallow pans just above the fire pot, the water level in these being automatically maintained by connection with the city water system. I would have a good psychrometer and see to it that the relative humidity was kept above 40%. I would have a good thermometer and keep the temperature at 65° F. unless the women folks complained, and not above 68° F. even if they did complain. I should expect good health and comfort dividends on the outlay of money and trouble required to get these conditions.

It will be seen that I have confined my discussion to houses and other places where few people assemble. The humidity problem is entirely different for public halls. Remember that each person gives off in the neighborhood of one quart of water as vapor each twenty-four hours. One hundred people give off twenty-five gallons. Three thousand people give off twenty-five barrels. Excess humidity is ordinarily the cause of discomfort in theatres, picture shows, etc. Public halls in this climate ordinarily need artificial renewal of air and a lower temperature rather than artificial humidification.

## DISCUSSION.

DR. H. W. HILL: I wish to express my gratification at hearing the Dean of the University of Minnesota Medical School preach to this high-class medical audience the very facts that brought me nearly to crucifixion for stating them three or four years ago. Particularly that the circulation of air was quite sufficient for ventilation and there is no necessity for opening windows.

As to the ladies objecting to low temperatures, a county superintendent related to me a method which he had employed of overcoming that difficulty. He found that the teachers were complaining very much of a temperature of 65 degrees. The thermometers were at this height on the wall. (Indicating a height of about  $4\frac{1}{2}$  feet above the floor.) He put those thermometers up a foot or so higher, where they registered 68, and there was no further trouble. (Laughter and applause.)

DR. L. M. ROBERTS, Little Falls: I would like to commend this paper as dealing with my own experience regarding a hot-air furnace. Some twelve years ago I put in a hot-air furnace. I had a very large old-fashioned house with double windows, and when the plumber put in the water tank he put it in at the base of the furnace. I asked him why he put it in there. He said, "They all do it." I said, "What for?" And he said, "To evaporate the water." I said, "What do you put it in that part of the furnace for?" He said, "Oh, they all do it that way." I said, "Go ahead, you are the furnace man." So he went ahead.

At that time I had a man who had been a locomotive fireman in his day taking care of my furnace, and we found that with the temperature as high as 80 degrees we were not comfortably warm and we were very uncomfortable at 70, and the air was dry and smelly and altogether unsatisfactory. My wife had some heavy portieres between the living room and the parlor, and they shrunk up about 4 inches from the floor, and our furniture went to pieces, and my wife was almost distracted and wanted another type of furnace put in. I said, "No, that furnace is calling for water and it is going to get it;" and I studied it out and I got a tinner to come up to the house, and I had him cut a hole in the jacket at the top of the furnace and make a galvanized iron receptacle 5 feet long and 8 inches wide and about 8 inches deep, which held 7 gallons and a half by actual measurement, of water. It rested on the peak, the top of the furnace, and all inside jacket. The trouble stopped; the portieres came down, the furniture went back to normal and my wife was satisfied. Best of all, the temperature of 65 is all we have cared to maintain since. There has never been any humidity on the glass anywhere, the wallpaper has never been affected, and the atmosphere is exceedingly pleasant and very sweet. It is automatic. In extreme weather I calculate that I burn as high as 35 or 40 gallons of water a day in that receptacle. The hotter the fire the greater the

evaporation. You can sometimes hear the water boiling. It is right where the hot air rushes past it and is carried up into the house. It is a very distinct success.

I want to say another word about ventilation. All of you who have been accustomed to being out late at night, and leaving your home and going into some other people's homes, and then returning to your own, have doubtless often noticed the difference in the atmosphere. I do not care how hygienic people try to be or how carefully they ventilate during the day, when they are shut up at night and you go into an ordinary house at 2 o'clock in the morning, and you have a hot water or steam-heating plant, the house smells. It may smell of perfume, it may smell of more or less sweet odors, but the house smells. This is what I call the acid test of any ventilating system, and in winter heat and ventilation should be synonymous terms. You may go into a house that is heated as my house is heated after we have had a stag party there, and everybody has smoked until the air is absolutely blue, two hours afterwards that air is absolutely odorless. I certainly commend my method and advise my friends to adopt it, as a great saver of fuel and health. Previous, we noticed the irritation in our throats and larynxes very markedly with that dry air, but with this moistened air it is very much like a June day.

And it is certainly a great saver of coal. When we first started in with the other method we burned as high as 12 tons of coal, ineffectually trying to warm the house. Since this, I do not think any winter,—and that has been over a period of 10 or 11 years since, I do not think we have averaged over 9 or 10 tons with the same house.

DR. J. C. BOEHM, St. Cloud: A winter or two ago I was calling on the Dean for a meeting. I did not get the proper notice, so I had to stay over at his house, and I saw him experimenting with the humidifier. We exchanged a few remarks. For that reason I came up here to listen to this paper.

At this time, when the price of coal is so high and the quantity of fuel is so scarce, we ought to put our heads together right now and hire men, if we cannot get them otherwise, to perfect something which would reduce the required temperature in our houses, in our schools, churches and other places which have to be heated.

Some years ago I came into my house which was at a temperature of 68 or 70. I took off my coat, and I was chilly. I was alone in the house. I covered all the rugs on the first floor with about 3 inches of snow and waited an hour and a half. The snow disappeared, of course. I looked on the floor; there was not a drop of water there. I sat down and was comfortable. I had lowered the temperature in that house from  $2\frac{1}{2}$  to 3 degrees. I was then convinced that although I have a hot-water system, that I would not have a hot-air system, for the simple reason that I have yet to find one (except Dr. Roberts'), that brings in a sufficient amount of moisture into the system to overcome the monoxide that is



being formed by the heated air that comes in contact with the hot iron. If that can be overcome the hot-air furnace may be all right.

Dr. Lyon has given us the mathematical explanation of our body evaporation, the amount needed, and has advised a very good humidifier. He did not show me that until today.

I myself have tried various schemes, and the best one, if you wish to supply the water, is to have a pipe leading along that radiator. Stretch a towel right across here (illustrating). A linen towel is better than any other kind. Your pipe should be slanting with holes in it, so that the water drops down, and a receptacle such as a five gallon pail beneath. It is not very pretty but it does the work. You will be surprised how easy it is to live in that room at a temperature of from 62 to 65 degrees.

I wish we had a mathematician here to figure out the amount of fuel we would save if we all did that, and especially at this crisis. I do not think that too much publicity can be given this topic, and this paper, and to bring it into every household.

Tell the salesman that this is no good (referring to a device which had been exhibited by Prof. Lyon during his address.) I have half a dozen of them. Mine have even a wick, and by capillarity it is supposed to evaporate some water. This has not got even that.

The other experiment I performed was in St. Paul, with my father-in-law, who is a contractor in the plumbing and heating business, and I have talked with him about this. He said, "We will fix up a little arrangement;" and he went to work and connected with the waterworks in the house, and I brought down a sprayer, and we took a half-inch pipe, and on top we had the nozzle strike a kind of umbrella-shaped affair, and that gave a nice spray, and behind that we had a little electric fan which did not use very much electricity. In thirty minutes the house was comfortable all over, by the use of the fan running thirty minutes. And whenever after that the house was cold, we did not go down and shake the furnace and build a bigger fire, but simply started the fan, and the vaporizer, as we called it, and the house got nice and comfortable.

That which I wish to direct to your attention is, what is it that makes us feel cold? Take a room at 65 degrees, and in the winter the ladies will claim that that is too cold. Why is it too cold? Because the evaporation away from the skin into the dry atmosphere makes it feel cold. If you take a bottle of alcohol and have it sitting in a room, it does not take long before the temperature of the alcohol in that bottle is the same as that surrounding it, 65 degrees. Take ether, which is a little bit better, and the same thing is true. Put the alcohol or ether on your hand, and see how cool you get it. Why? It is because the evaporation has gone away from your skin. All these things tend to seek their level approximately or absolutely. And if the atmosphere is saturated approximately to that same degree that our body is, there will be no evaporation away from

the skin, and we feel comfortable at 62 degrees. If on the other hand, the atmosphere is dry, there will be evaporation and you will feel cold at 70 or even 75.

The question the Dean asked was as to the therapeutic effect or the pathological effect, which was it, that this dry atmosphere has? My personal knowledge and experience have been in my practice. I have now before my mind five families, with from four to seven children in each family, that had sore throats from the time they started the furnace and the weather began to be near zero, until it got warm enough so they could open the windows and have the air come in. I kept drumming at them to throw out the hot-air furnace, which they finally did. They put in a humidifier. That evidently had a good effect, because they did not get sick any more and I lost their practice. A lady who previously complained of being cold at a temperature of 70 or 72 degrees, now sits there thoroughly satisfied in a temperature of 64 or 65.

DR. L. M. ROBERTS, Little Falls: I had my waterworks arranged so that there is a pipe right off of my tank with a short section of hose, and it is no labor at all to keep the tank full. Any time any one goes down to the furnace he looks at the tank and can easily keep it filled. All that is necessary is to push a small trapdoor open, put the hose in and turn a stopcock. There is no carrying of water. It is a great convenience to have the water system arranged in that way.

PROF. E. P. LYON (closing the discussion): The psychological factor is well illustrated by Dr. Hill. We have to be careful in drawing conclusions because people "feel" a good deal according to what they think. If they think the temperature is 70° when it is really 65°, they feel better than if they think it 65° when it is really 70°!

I have a little evidence, which though not strictly scientific tends to confirm the general impression of feeling more comfortable with higher humidity. In my own house last winter I set the regulator so that the temperature was at 68°, without the women folks knowing anything about it; and with the higher humidity which I now maintain, there was no complaint, although in previous years at 70° to 72° there had been complaints. The ladies dress more lightly than the gentlemen, which is one reason why they complain more than we do.

This psychological factor made me say nothing at all about possible coal saving. We often hear it said that there is a saving of fuel if proper humidity is maintained. But I know of no experimental data. If any of you have absolute records on your coal extending over a considerable period of time and under varying humidities I should like them very much. I should like the facts in tons and dollars rather than general statements founded on general impressions. I believe there is a saving but I don't know. You have to evaporate more water to get humidity, and that takes more heat; but nevertheless, the loss of heat from the house in radiation



from the walls and leakage through them must be less when the temperature is lower than when the temperature is higher. Of these factors I should suppose the latter would more than compensate the former. I should be particularly gratified to have any of you send me distinct observations which satisfy you in this matter, or distinct records of coal used which any of you may have.

DR. J. C. BOEHM, St. Cloud: May I add one word more? Dr. Lyon spoke of spoiling the wall-paper. That can be overcome very easily. But of course you have to build your house for it. You cannot go into an old house and do it unless you tear off the siding and rough boards outside. But when the house is built, if it is a frame house, between the studding you should put plenty of paper over this way (illustrating) and nail the lath over it, creating dead-air space. Have good building paper, of good quality. In front of this, lath another one, and so on, until you have practically several air-tight spaces, but not air-tight like Dr. Hill wants it, but that will allow the air to become warm inside and gradually cool on the outside, and it will prevent that precipitation that Dr. Lyon spoke of.

#### PATHOLOGY AND TREATMENT OF OSTEOMYELITIS.

ALEX R. COLVIN, M. D.,  
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The one feature of osteomyelitis that cannot be too often dwelt upon is that it is most frequently an acute destructive inflammation of bone, and that the bone should be opened early and widely. One will not be lessening the emphasis on this feature by saying that it is at the present day difficult to imagine anyone failing to open a bone under such conditions after the diagnosis has been made, but one can readily understand a difficulty in diagnosis in the early stage of the trouble, and for some reason or other we hesitate to do exploratory operations on bone as readily as we explore the abdominal cavity. Under urgent circumstances, however, it is just as imperative to do so. Once the pathology of the disease is mas-

tered, the more extensive and difficult anatomical knowledge required need not deter us from exploration.

The classification given in the table shows the area of bone which may be involved, and enables us to carry clinical pictures, but we must realize that after all the disease is one affecting the whole structure of bone and that any localization of it is in a sense accidental.

The question of periostitis needs some consideration. Unless we think of periostitis as really part of an osteitis we are liable to err in treatment.

In acute hematogenous infections the incidence of periostitis means that the infection has travelled from the interior of the bone and that pus has accumulated beneath the periosteum. We have been deceived in the past because on opening such subperiosteal collections the condition was recovered from at once and hence we concluded that the interior of bone was not involved. We know now, however, that even with extensive involvement of the interior of the bone, nature may establish drainage and the condition be recovered from without surgical assistance of any kind. While this occurs often enough, nevertheless it is exceptional and must not influence us in our conduct of the treatment of acute infections except by proving that periostitis is not an independent condition and that opening the bone is essential.

The mere opening of the bone is neither difficult nor hazardous. The difficult part of the dissection is to reach the bone.

Joint complications, necrosis with its prolonged and complex pathology, will be less often encountered if the opening in the bone has been extensive enough to establish competent drainage.

Having recognized the osteal character of the infection, the localization of infections is the next most important item in pathology. This has become such common knowledge that one scarcely need refer to it except to empha-

TABLE.

OSTITIS ACUTE	{	Acute Ostitis of the Diaphysis	{ Acute Periostitis
			{ Acute Central Osteomyelitis
			{ Acute Osteomyelo-periostitis
OSTITIS CHRONIC	{	Acute Ostitis of the Epiphysis	{ Acute Perisstitis
			{ Acute Central Osteomyelitis
	{	Chronic Periostitis	{ Acute Osteomyelo-periostitis
		Chronic Central Osteomyelitis	
		Chronic Myelo-periostitis	

size by illustration the resulting lesions. It will be noticed in the illustrations how often the trouble is located in the shaft rather than in the epiphysis, indeed epiphysitis in pyogenic disease is quite rare. The anatomy of each individual bone must, of course, be kept clearly in mind to enable us to realize the possibility of shaft, epiphyseal and joint involvement. The frequency of purulent arthritis of the hip in infections of the upper end of the femur, for instance, is due to the fact that the diaphysis or shaft is included within the capsule of the joint. In most of the other joints only the epiphysis is thus included and consequently because of the infrequency of epiphyseal involvement purulent arthritis is uncommon, the attending joint swelling being as a rule serous in character. The infecting agent having arrived at a certain point in the vascular areas of the bone, the resulting conditions will depend upon the virulence of the invading micro-organism and the resistance of the organism involved.

The great variability in the clinical and pathological manifestations of infection can be beautifully shown in bone. An acute general septic invasion where the bone infected is but an incident in the process of annihilation of the individual, contrasts markedly with an infection of one or more bones so slow in its progress and indolent in its manifestations that sarcoma is mimicked. Drainage having been established, restoration to the normal may occur especially in the young. On the other hand, in spite of drainage, destruction may proceed slowly, necrosis may have been limited rather than presented, and the complex condition of sequestrum formation and bone regeneration in varying ratios, is encountered. It is in this stage that radiographs furnish us with valuable information. Taken from time to time they show quite clearly the separation of the sequestrum and the formation of the involucrum. Inasmuch as bone regeneration and production play so important a part in the complex pictures of destruction and repair, a clear conception of the share taken by the different parts of the bone in repair is essential.

Much speculation has been indulged in regarding this osteogenetic function of the various divisions of the bone tissue. It is now conceded that the osteoblast whose mesoblastic

origin and relation to connective tissue has always been acknowledged, is the dominating factor in bone regeneration; whether this tenacious cell is locked up in bone lacunae, lines the boundaries of the medullary cavity, clings to the trabeculae of the spongy tissues, or congregates on the confines of the compact tissue beneath a limiting or protective membrane, all are agreed that it is an integral part of bone, having the same vital connections with its surroundings that other cells have, and that regeneration of this most highly differentiated connective and supporting tissue is presided over by the familiar osteoblast.

Bone production goes hand in hand with bone destruction in the chronic stages of the disease and this may result in localized thickenings on the surface, or in a surrounding new shaft, or to a uniform thickening of the old shaft. This latter condition may result from a slowly progressive infection without any actual bone destruction.

The recognition of these facts is of the utmost importance in enabling us to interpret the complex pathological condition as seen in the radiograph. Our operative treatment is really an unravelling of pathology and can be much more intelligently done under radiographic guidance. It is sometimes said that if acute osteomyelitis were treated properly there would be no such thing as the chronic stage. This is only true in part, for many cases are so insidious in onset that marked bone changes have occurred before we see them at all, and before the patient has had any symptoms impelling them to seek assistance. It is in these chronic forms that the greatest difficulty in diagnosis occurs because of the tumor-like thickening of the bone with few symptoms; and tumor-like masses of indurated tissues surrounding the bone increase the difficulty.

After the removal of the sequestra, each case demands separate consideration as to the best means of dealing with the resulting cavity. In the young where osteogenesis is comparatively rapid, the bone wax is especially valuable if for no other reason than furnishing a kind of drain, but occasionally where drainage ceases it keeps the cavity filled until such time as osteogenesis has built sufficient new bone to obliterate the cavity from which the wax has been

gradually absorbed. In adult bones where osteogenesis is slower or where it may fail to accomplish the desired result, the plastic use of bone, muscle, fat or skin may be desirable.

During the course of the disease, joint contractures are prone to occur, and the protective and mechanical treatment to prevent these are of utmost importance. Where the sequestrum involves a large part of the shaft, fracture of the involucrum may also occur if protection is not sufficient.

#### DISCUSSION.

DR. SAMUEL J. MIXTER, Boston, Mass.: It seems to me, there is only one fault in this paper, and that is, the author did not have X-rays taken of the humerus at shorter intervals and show them as a movie, because this is certainly a most remarkable series of pictures that one can imagine from the beginning to the end of the process, and if he had had them taken a little oftener and put them in a machine, it would have shown the whole thing.

There is one type of case that is important, and that is, where we have in the adult a sudden, very acute infection. Perhaps it has been opened and insufficient drainage established; but the whole shaft is involved to the tibia. Nearly the whole shaft is involved. The man is very sick. You can cure that man if you amputate his leg. If you open up that bone, and do a real, thorough operation, a conservative operation, he is going to die. I have seen them die in from three to twenty-four hours after such an operation. On the other hand, amputation will save them, while a conservative operation will kill them. There are certain of these cases which we meet with very seldom, but when we do they must be recognized.

DR. JAMES E. MOORE, Minneapolis: It is with a great deal of pleasure that I respond to the request of the Chairman to discuss this paper, because after teaching surgery for thirty-five years I feel that if there is any field in which I have accomplished some good it has been in teaching osteomyelitis to students,—how to diagnose the condition and how to treat patients with this disease, which, in earlier days, was neglected.

I do not think it would be amiss to dwell briefly upon the diagnosis, because in the University Hospital where we have cases coming in from all over the state, and from other states, we find many that have been neglected. We have found many cases of osteomyelitis that have not been recognized, and have been usually sent in with a diagnosis of rheumatism. All sorts of diagnoses have been made in these cases.

I want to call your attention to one important point, one in which you might be misled by these skiagraphs which you have seen today, and that is, that the skiagraph will not show infection in the

medullary cavity of bone at a very early stage. You may have a pronounced abscess at the end of the diaphysis of the long bone, you may take a beautiful skiagraph which will show all the trabeculae of the bone, but it will give you no evidence whatever of an abscess. You may cut in and discover the abscess. That is something you must guard against. The history in these cases is so complete that, it seems to me, there is no longer any excuse for a mistake in diagnosis, or neglect to make the diagnosis. Last summer a little child was brought into the University Hospital with an infection of the neck of the femur. The child had a temperature of 104°, and yet these boys, interns of mine, made a diagnosis of osteomyelitis beginning in the neck of the femur in the growing bone.

A child is brought in after playing probably all day, particularly when that child has been going in swimming, or has been skating, complaining of the knee joint. Perhaps the knee hurts terribly. Pretty soon the mother finds the child's cheeks red, and shortly thereafter the child will have a severe chill. A doctor is sent for. Already flexion has begun to take place, and the old-fashioned doctor will say rheumatism and apply a poultice, and so on. No modern practitioner will make a mistake there. He will examine this child who says that his knee hurts, and he will find the seat of pain is not exactly in the joint. If he carefully manipulates the extremity he will find that the excruciating point of tenderness is always a little above the knee joint or a little below. In other words, you have an infection in the center of one of these bones in the medullary cavity and a sensitive point at the beginning of periostitis. Periostitis is not the original lesion, but secondary lesion. Periostitis, with the exception of a few cases in typhoid fever, is secondary to osteomyelitis, to the central infection.

Dr. Colvin called attention to one very important point in the treatment on which I want to lay stress. As soon as you make a diagnosis in one of these cases, put the limb in a position in which it will be the most useful should ankylosis occur. Too frequently we have children brought into the University Hospital with ruined knees because the doctor had neglected to put the limb in proper position. We try to do what we can for these children, but invariably we find the knee flexed at a right angle, making it useless. That is malpractice. Given this acute train of symptoms,—chill, high temperature, and a tender spot near a joint,—it cannot be anything else but acute osteomyelitis.

The diagnosis having been made, there is only one treatment, and that is, to cut down into the center of the bone. Do not be content to stop after you have cut down through the soft parts to empty the abscess; you have only reached the secondary complication, as it were; you have not reached the original seat of infection. You must chisel down into the medullary cavity and establish drainage. The most difficult part of treatment of osteomyelitis is in

the old cases that have chronic sinuses. Some of them have been operated on and the sequestra removed, but most of them come to us with sinuses and with evident sequestra that the skiagraph demonstrates. Then it is easy to operate and remove the sequestra and start the patient on the road to recovery, but without proper treatment the patient will continue on indefinitely. You have a bone cavity that is larger in its body than it is at the exit, which will never heal as long as the child lives; you must help nature.

The essayist has suggested the most modern way of treating these cases, and that is, to get these cavities cleaned out and fill them with the Moorhof bone wax. I have had gratifying results from such treatment based on surgical principles. Nature will displace that bone wax and replace it with bone, and you will get the cavity filled up; otherwise, you must resort to the old method of packing, which is a long, tedious process. The most difficult part, as I have said, in the treatment, is the curing of these old cases with sinuses. In those in which the sequestrum has been removed, with the proper application of the bone wax you can get highly satisfactory results.

DR. ALEXANDER R. COLVIN (closing the discussion): While agreeing with every word Dr. Moore has said, I am nevertheless much impressed with the difficulty of an accurate pathological diagnosis in acute infections of bones and joints, and I have a fellow-feeling for my medical brethren under certain trying conditions. However, there should be no hesitation as to what should be done as soon as the diagnosis is made.

I have under my care at the City Hospital at present, a child of six years who was admitted with a temperature of 104° and a decided hip limp with muscular spasm on attempted passive movement. The condition was suspicious of osteomyelitis of the upper end of the femur. If one's suspicions were correct, it was imperative to attack the bone, but because of doubt nothing was done and the condition gradually cleared up; this was certainly an acute infection of either the bone or joint.

There is no doubt that very stormy infections of joints clear up without suppurating, whether, especially in the young, an acute infection of bone may pursue the same course is questionable but I think it probably does. The very great variability of the clinical and pathological manifestations of acute infections by the same micro-organism, in the same organism, and at the same time, is a most interesting phenomenon. For instance, in a case under observation having an initial suppurating infection of a tendon sheath with metastatic suppurating foci in the calf muscles and at the same time a severe non-suppurating arthritis of a shoulder and hip joint.

The symptoms of an acute infection of the joint end of a bone are practically those of joint inflammation.

## THE SURGICAL TREATMENT OF PROGRESSIVE ULNAR PARALYSIS.\*

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Progressive ulnar paralysis is a clinical condition which has long been recognized but has rarely been treated surgically. It has been diagnosed as a progressive muscular atrophy and as a form of muscular dystrophy. A number of patients have been examined in the Mayo Clinic who have had a single progressive ulnar paralysis and no other form of paralysis or atrophy. The operative findings in these cases verified the clinical condition and presented a marked interstitial neuritis with a diffuse thickening of the nerve as well as nodular masses like neuromas.

**Symptomatology.**—The patients who have been under observation in the Mayo Clinic present similar symptomatology: First, the complaint of various forms of slow, progressive sensory changes, such as paresthesias and anesthesias, that is, tingling, hypersensitive areas of the skin, and numbness along the course of the ulnar nerve. Second, trophic disturbances, atrophy of the small muscles of the hands, of the flexor carpi ulnaris and of part of the flexor profundus digitorum which are supplied by the ulnar nerve; the atrophy of the hand is most



Fig. 1.

Photograph illustrating the atrophy and the contraction due to a paralysis of the right ulnar nerve.

\*Presented for publication April 10, 1918.



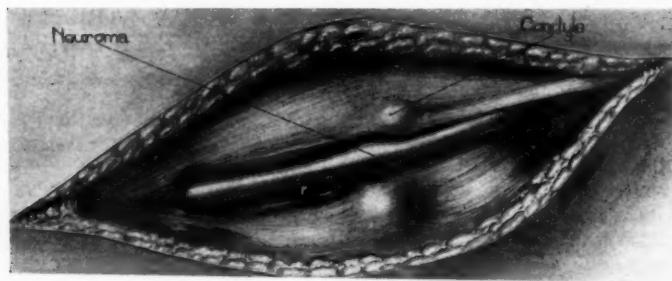


Fig. 2.

(Case 82214.) Exposure of the ulnar nerve with a neuroma due to trauma, without division of the nerve, associated with an old fracture of the elbow.

prominent in the hypothenar region, and there is marked depression between the base of the thumb and the second metacarpal bone. Third, a progressive motor paralysis, first noticed as a definite weakness, and then a gradual loss of motor control of the muscles involved. This phase also presents a peculiar contracted condition of the two outer fingers. (Fig. 1).

Recently we have operated on the ulnar nerve in three cases in which there were very definite pathologic findings. The nerve was found to be very much enlarged and to present one or more so-called "neuromas" (intraneural fibrous tissue). The enlargement was of the fusiform type with definite thickening and hardening of the nerve itself and the neuromas were quite definitely circumscribed, though more or less diffuse throughout the nerve tissue. The ulnar groove between the internal condyle and olecranon was found to be very shallow, owing, in two cases which were end results of old fractures, to an overgrowth of bone from the olecranon. In one instance a very definite bony spur of the ulna was present, without a history of fracture. It appears that the diffuse thickening of the nerve is due to frequent or constant but very slight trauma, such as bruising, or to the stretching of the nerve over some of the bony prominences. Small hemorrhages in the perineurium and in the endoneurium result, causing inflammatory reactions and the deposit of scar tissue. As the scar tissue tends to contract, many of the fibers become strangulated and eventually are destroyed, resulting in a gradual and progressive atrophy of the ulnar nerve.

### Reports of Three Cases

Case 1 (82214).—R. L. K., a male, 31 years of age. The chief complaints were numbness, atrophy and weakness of the muscles supplied by the right ulnar nerve. The patient fractured his elbow in 1892, displacing the internal condyle downward and inward, and giving the elbow a broadened appearance. The displacement of the internal condyle carried the ulnar nerve with it, leaving it in a very much exposed position on the apex of the displaced fragments, thus causing its frequent injury. Two months previously the patient received a very hard blow on the elbow. Following this he noticed marked numbness, slight loss of tactile sensation, and beginning atrophy of the small muscles of the hand, associated with corresponding weakness. The weakness of the hand was progressive and surgical relief was advised and decided on (Fig. 2).

Operation, Jan. 17, 1918.—The ulnar nerve was exposed in its extremely shallow groove, and the nerve was brought up over a portion of the internal condyle. For a distance of about 3 cm. the nerve was considerably thickened and presented a neuroma of about one-eighth the size of the normal nerve, situated over the most prominent portion of the internal condyle. The nerve was freed from the surrounding structures and transferred to a position internal to the condyle.

Case 2 (220582).—J. A. L., a farmer, aged 42 years. There was no history of fracture or bony disturbance of the elbow. There was numbness, and a tingling sensation in the right hand, with atrophy and weakness of the mus-



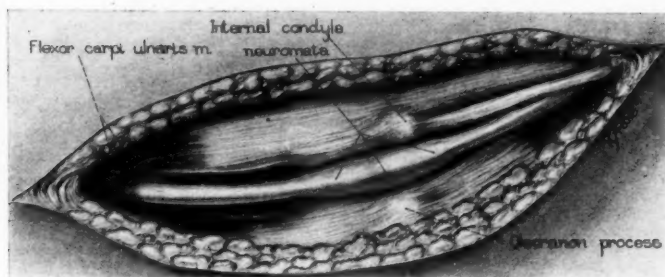


Fig. 3.

(Case 220582.) Exposure of the right ulnar nerve in position illustrating three small neuromas in the nerve, due to trauma without severance of the nerve or fracture of the elbow.

cles supplied by the right ulnar nerve. Four years previously the patient had first noticed numbness and tingling sensation in the right little finger and on the ulnar side of the ring finger. Afterwards he noticed that those two fingers became cold sooner than other parts of the hand; a little later he noticed that the hypothenar surface of the hand became very thin and flabby; then a marked depression appeared between the base of the thumb and the second metacarpal bone, together with atrophy of the muscles of the outer part of the right fore-arm. About six months previously the patient had noticed that when he flexed the fore-arm on the brachial region, the numbness and tingling sensations were increased, with associated pain above the right clavicle. At the time of examination he complained of more or less constant numbness and of a tingling sensation along the course of the ulnar nerve. There was marked atrophy of the small muscles of the hand; the flexor carpi ulnaris and part of the flexor profundus digitorum presented a decidedly thickened and nodular nerve in the ulnar groove (Fig. 3).

Operation, Feb. 9, 1918.—There was a fusiform thickening of the ulnar nerve for about 4 cm. over the prominent portion of the elbow. In addition there were many adhesions about the nerve, with three neuromas which were about one-fourth the size of the normal nerve, the latter situated so that each came in contact with the other in the thickened portion of the nerve. The ulnar groove between the

condyle and the olecranon process was normal in its depth when the arm was extended, but on flexion of the fore-arm a bony prominence, a spur from the ulna, presented itself, which exposed the ulnar nerve and produced a constant irritation.

Case 3 (222410).—Mrs. J. S. D., age 32 years. The patient complained of numbness and a tingling sensation on the outer surface of the hand and fore-arm. There were atrophy and weakness of the muscles. Twenty-three years previously the patient had had a fall which resulted in the epiphyseal separation of the humerus at its lower extremity. Two years after the first fracture she had had a similar experience, but at that time there was no ulnar disturbance. Five years previous to our examination the patient first noticed numbness, more or less constant, in the little finger of the left hand, and three years later she noticed a beginning contraction of the two outer fingers of the left hand, which was associated with a thinning of the hand and a gradual loss of strength. During the last ten months she had noticed that the numbness was gradually increasing, extending from the hand to the fore-arm, and that in the last three of four months there had been a constant dull ache in the region of the elbow and shoulder. On coming to the Clinic the patient presented a picture of paresthesia and anesthesia, of atrophy, and motor weakness, which followed the course of the ulnar nerve (Fig. 4).



Fig. 4.

Exposure of left ulnar nerve with two neuromas due to trauma, associated with an old fracture of the elbow.

Operation, Feb. 23, 1918.—The ulnar nerve was exposed and found to be very much thickened at the most prominent portion of the elbow. There were many adhesions and two definite neuromas, one about one-third the normal size of the nerve, and the other about one-fifth the normal size. These neuromas were located over the most prominent portion of the elbow. The ulnar groove was very shallow, owing to a lateral overgrowth of the olecranon process which subjected the nerve to constant trauma.

#### Technic of the Operation.

Because of a tendency to overgrowth of callus which results in a condition similar to that for which the patient seeks relief, we have chosen as a surgical procedure, the transference of the nerve to a position anterior to the internal condyle in preference to removing bony prominences or creating a new bony groove as has been done by several other surgeons.

The nerve is freed for a distance of about three inches above the internal condyle as well as for three inches below it, and is then raised from its old ulnar groove to a position internal to the condyle. The tendons and a few of the muscle-fibers of the inner head of the flexor carpi ulnaris as well as a few of the tendonous fibers of the common flexor tendon are divided in order to bury the nerve underneath the tendonous fibers, rather than to leave it exposed on the surface of the internal head of the flexor carpi ulnaris, which would tend to expose it to slight trauma. The nerve is held up in

place by a fascial tube, somewhat similar to that employed by Lewis\* in his nerve anastomoses, the fascia lata being taken from the thigh. This is sutured to the bicipital fascia and to the deep fascias covering the brachialis anticus and the common flexor tendon. The nerve is not attached to the fascia but is permitted to lie loosely within this hammock which prevents it from slipping down over the condyle as the arm is extended (Figs. 5, 6, 7, 8 and 9).



Fig. 5.

Incision for exposure of ulnar nerve.

\*Kirk, E. G. and Lewis, D.: Fascial tubulization in the repair of nerve defects. Jour. Am. Med. Assn. 1915, lxx, 486-491.

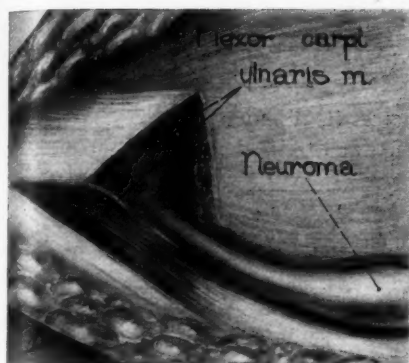


Fig. 6.

(Case 220582.) Division of the inner head of the flexor carpi ulnaris along with some tendinous fibers of the common flexor tendon, prior to the elevation of the nerve from its normal groove.

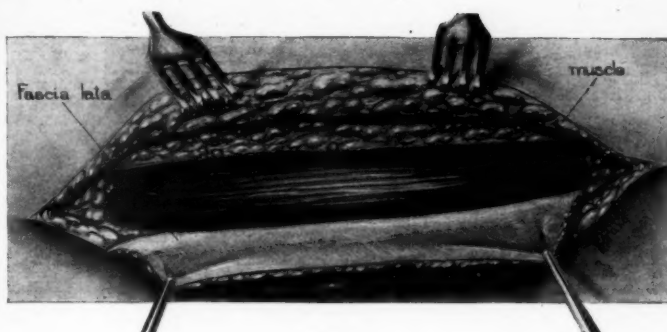


Fig. 7.

(Case 220582.) Removal of the fascia-lata which is to be used to make a covering for the ulnar nerve.

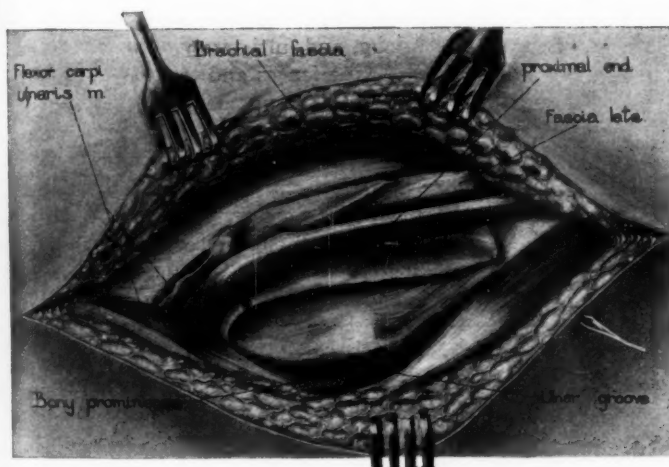
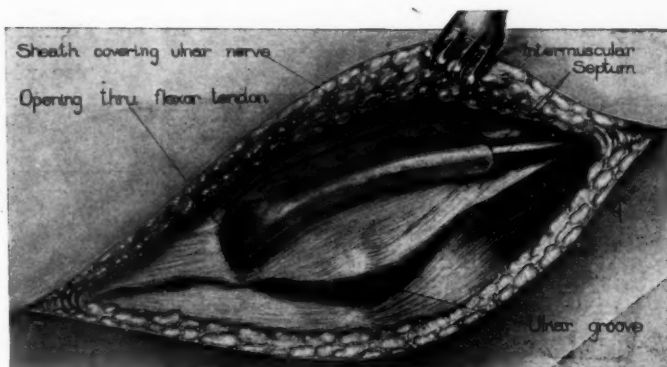


Fig. 8.

(Case 220582.) Elevation of right ulnar nerve to a position internal to the inner condyle lying on the sheath of fascia which is used in the fixation of the nerve, as well as illustrating the bony prominence in the groove due to overgrowth of the bone from the ulna.

Fig. 9.

(Case 220582.) Right ulnar nerve held in its new position by suturing the fascial sheath surrounding the nerve to the deep fascia covering the structures anterior to the elbow.



The treatment of the thickening or of the neuroma depends largely on the amount of paralysis present. If, judging from the neurologic findings, the patient has complete or three-fourths paralysis of the ulnar nerve, complete resection of the diseased portion of the nerve with anastomosis of the severed ends, are advised; but if the paralysis is less than half, instead of resection we advise the longitudinal splitting of the epineurium and perineurium in several places about the nerve in order to liberate the columns of nerve fibers from the contracting scars. If it becomes necessary to resect and anastomose the nerve, it is comparatively easy to bring about a direct apposition of the severed ends, and then to anastomose by the use of interrupted silk sutures in its sheaths. After the nerve has been transferred to its new position, the flexor tendon as well as tendinous fibres from the common flexor tendon are sutured back to their normal position, thus making a new groove for the entrance of the ulnar nerve, which passes underneath the inner head of the flexor carpi ulnaris to its normal position between the two heads and under the flexor carpi ulnaris. The wound is closed without drainage.

It is advisable to use massage postoperatively. Electricity has probably little value. The nerve in its new position causes very little trouble and the results are most gratifying in that the progressive paralysis ceases, or improves to an appreciable degree, particularly if the nerve has not been injured too severely.

### Conclusions.

1. Progressive ulnar paralysis is a definite clinical entity, the result of a slight trauma, or a bruising or stretching of the ulnar nerve over small bony prominences in the region of the nerve.

2. The condition is characterized by: (a) sensory changes, — paresthesias and anesthesias; and (b) atrophy of the muscles involved, with gradual increase of motor paralysis.

3. The surgical treatment consists of transference and fixation of the nerve to a position internal to the inner condyle, with longitudinal splitting of the epineurium and perineurium, or the resection of neuromas followed by anastomosis.

### THE CLINICAL ASPECT OF PROSTATIC HYPERTROPHY.\*

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The work of the individual is gradually being merged into the broader field of co-operation, and it is through the collaboration of many men that the vast number of surgical problems are brought to the highest development of specialization. Thus, for years, the methods of operative approach in prostatic hypertrophy have been studied by such men as Fuller Freyer, Proust, Young, and their followers, until we have now arrived at a reasonably definite conclusion regarding it. The suprapubic prostatectomy is the operation almost universally adopted.

The question of the two-stage operation is having its inning, and, ultimately, through the interchange of experiences and the stimulation of the interests of different men, will be satisfactorily solved.

The indication for operative interference is still a very important phase of the subject for general discussion, as too many prostatiques become grave surgical risks before they present themselves for operation.

If the general practitioner can be stimulated into taking a greater interest in the cases of men past middle life, who come to him professionally, in order to determine any enlargement of the prostate; if he will take time to ascertain whether his patient has residual urine, by passing a small, soft catheter after the bladder has been emptied naturally, he may save him many resultant complications.

With the use of the cystoscope, an examination will readily disclose the condition of the gland, and is a valuable aid in diagnosis.

### Clinical Indications.

The clinical indications for the removal of the prostate, are based on the pathological conditions present in the gland, as manifested by symptoms relative to obstruction. It is, therefore, necessary to bear in mind this fact—that

\*Presented before the Southern Minnesota Medical Association, Winona, June 24-25, 1918.



we are dealing with symptoms of prostatic obstruction, rather than with the hypertrophied gland.

The early clinical symptoms may manifest an intermittent, or a continuous course. They are produced by the mechanical interference of the hypertrophied gland. The function of the bladder is interfered with, and it begins to empty itself more frequently, both day and night. The act of urination becomes more difficult and prolonged. The stream starts slowly, flows less forcibly, and sometimes intermits.

The symptoms are more pronounced when the bladder has not emptied itself for some hours, so that the individual is unpleasantly reminded of it when he first rises in the morning. These early symptoms are present in nearly every case of prostatic obstruction. Examination at this time will show residual urine.

This is the stage when it is most desirable to operate—for the following reasons:

1. The symptoms will not manifest any spontaneous improvement.
2. The bladder is still free from bacterial invasion.
3. The kidneys are not suffering from any back pressure.
4. The general health of the patient is not undermined.
5. If the hypertrophy be malignant, it is the early operation that gives the patient the best chance of recovery.

### Secondary Symptoms.

At the present time, too many cases are coming to operation with secondary symptoms. These symptoms must be classed as the complications of the prostatic. They are brought about by the intoxication from the presence of residual urine, or by damming back in the ureters and pressure in the kidneys, with the resultant renal insufficiency. When complete retention occurs, it may be acute or chronic in its course.

The acute cases invariably are those whose symptoms have come about so insidiously that little attention has been given them until, through exposure or over-indulgence, there is an attack of retention of urine. Relief is obtained through catheterization, but almost ever after, the catheter will show residual

urine after micturition. It is our duty here to impress the patient with the danger of the permanent use of the catheter, and to advise operation.

The habitual use of the catheter must be denounced under any circumstances, as cystitis is sure to develop, in spite of all precautions. Statistics show that the average life of the patient using a catheter is about five years, while a properly performed prostatectomy will give permanent comfort and relief.

In the chronic form of retention, with the clinical symptoms present, the residual urine gradually increases until eventually the bladder becomes more or less extreme, depending on the length of time of the retention, or the duration of cystitis present.

The cases of chronic cystitis and the cases of extreme atony are very difficult to treat, and are the cases that most frequently complain after the prostate has been removed.

There is another type of case one should mention. That is the type having a hypertrophy of the anterior portion of the lateral lobes. The prostatic enlargement is in front, and protrudes into the bladder, anterior to the vesical orifice. This class might easily be mistaken for stone in the bladder. In these cases, the sphincter closes with difficulty, allowing a constant dribbling of urine, but there is no residual urine, and the hypertrophy of the prostate is uncertain. The cystoscope is the only definite means of diagnosis.

The symptoms of retention, and not the size of the gland, call for operation, as some very large glands do not prevent a complete emptying of the bladder.

The internal compression of the kidneys, pyonephrosis, the cardiovascular changes, toxæmia, high blood pressure, and defective renal functions, are responsible for the mortality of the prostatics. These statistics will be lowered when such cases come to operation before they are undermined with these complications.

Should the thoughts set forth in this article stimulate a great enough interest to lead to an early recognition of the disease, and with this to an early operation, a marked advance in prostatectomy will have been made, and, in a measure, my purpose will have been accomplished.



## DISCUSSION.

DR. HARRY A. BAKER, Minneapolis: In the absence of those members whose names are down to open the discussion on this paper, I would like to say that the subject is a very important one, and it is very pleasant for me to be able to agree with the author in all of his findings.

The treatment of hypertrophy of the prostate to my mind is now standardized, and with the use of the catheter in competent hands the danger of infection is not so great. The patient can be made comfortable and maintain his physical status quo, or he may seek recourse to operation for relief and cure. I have observed that prostatitis otherwise are in good health and of robust constitution, and I have concluded that if the condition of hypertrophy of the prostate is recognized soon enough and a regimen instituted sufficiently early, and not a long time allowed to intervene before the undermining and breaking down of the constitution, much can be done for this class of patients. So I believe the two important factors in prostatic hypertrophy are, first, its early recognition, and then after its early recognition, the institution of proper catheter life.

The early operation that the essayist spoke of is very essential, but with the institution of proper regimen early operation may be delayed for years.

There is another form of prostatic hypertrophy concerning which no mention was made by the author of the paper, and that is the hypertrophy that follows and accompanies Neisserian infection. I believe that to be a very important form of hypertrophy, and while the treatment is very important, such treatment has not as yet been standardized. While after a time the hypertrophy subsides, at the same time there are many cases with symptoms and all the pathology which follows. While they should be clinically symptomless, this form produces symptoms sometimes as extensive as those of pregnancy. I think that the prostate takes on a larger aspect than that of an organ acting as a carrier for fluid. It is more important as an organ of internal secretion, but probably not as important as the pancreas or other organs. As a matter of fact, the prostate is part and parcel of the gonads, and it is not an easy matter to separate the gonadal adnexa in man like it is in woman. So my thought is that besides instituting treatment in these cases, it is equally important to know when and how in some way to stop treatment, because the patient requires not so much the assistance of a surgeon as he does the services of a psychiatrist to bring about a cure. A great urological joy with me is to discharge a man as cured who has gone through clinic after clinic to get rid of urethral shreds or an imaginary hypertrophy, and surely of the very few joys that come to us, perhaps that one joy of service to one's fellowman is the greatest.

DR. V. J. HAWKINS, St. Paul: From my limited experience it would seem that the operation of prostatectomy is not standardized yet, and until we can keep the bladder without infection we have not

standardized the operation. We all know very well that we cannot use a catheter for irrigation purposes for any length of time in the bladder without getting infection, no matter what the reason is for instituting this procedure in the beginning.

When it comes to the operation it seems to me it never will be standardized until we reach that point where we do not injure the urethra, and where we are not going to have infection follow. Those are fundamental principles underlying all surgical procedures; they have been worked out and developed and perfected in the last twenty-five years. Until you can do that with the prostate you are not going to have the operation become popular with even old men who know that they are going to die very soon.

I have seen a great deal of this work not only in my own practice but in that of other men, and my experience has been that these patients practically all get more or less infection. Not infrequently these patients are treated until they are either worn out and die, or they die shortly thereafter because they have so little resistance. The sooner we can institute operative procedures in these cases the better and greater the resistance they have, so that it is very essential to get these cases early and adopt a plan of removing the obstruction that will be permanent and without infection, leaving a good urethra that will be under the man's control. We should not destroy even the seminal vesicles in these men, even though they may not need them any more. We do not want to destroy anything of that kind. We should strive to do an operation that will relieve the obstruction without leaving infection.

DR. WANOUS (closing): I have nothing special to add except to say that my reason for advocating early operation in these cases is that the removal of the prostate is not difficult. As a matter of fact, it is a very simple operation. It becomes difficult when one encounters complications by waiting too long. If we can teach these old men they are not going to suffer from the removal of the gland, if we can teach them that the danger of this operation comes from waiting too long, and that every year adds to the danger, we will have accomplished a great deal. Delay in operating adds the danger of cystitis and infection, and in the presence of these conditions the operation becomes serious. As we encounter these cases today, practically all of them are infected. That is why I say it is necessary to get them earlier.

As far as the technic of the operation is concerned, I believe nearly everybody is doing the suprapubic operation. Many of these patients when they come under our observation have infection and damaged kidneys. If the bladder is distended, and we cannot pass a catheter through the urethra, we resort to punctures of the bladder, empty it, and that leads to a crisis. The patient may die and we call it renal insufficiency. The next old man will be fearful of such an operation. If you do not operate and the man dies, there is a complication, and you call it uremia. I think there are as many patients who die of uremia as there are those who die of renal insufficiency.

## THE WAR AND AFTERWARDS.\*

PIERCE BUTLER,  
St. Paul, Minnesota.

Mr. President, Members of the Southern Minnesota Medical Association: It is a source of great pleasure to me, and I regard it as a great privilege, to be here this afternoon to take part in the patriotic session of this Association. Since accepting the invitation of the Chairman of your Committee on Program, I have been at a loss to know what to say on this occasion. The place, the meeting, the time, the circumstances in which we live all contribute to making the occasion memorable.

Winona is the "first daughter" of the great north star state, its fairest and most beautiful city. From the days of her commencement to her present hour, in all that makes for the welfare of man and nations, the Southern Minnesota Medical Association has stood foremost, and to ask an outsider to speak of patriotic things here is like carrying coals to Newcastle. Of all the citizenship of the country, none excel in this time in patriotism the medical profession of this great nation. Admired always, the work of your profession has ever been one of service and sacrifice, and the medical profession of Southern Minnesota, whether tested by professional attainments or professional character, or the supreme test of patriotism, stands second to no medical organization in the United States. (Applause.) It has sometimes been said that the lawyers, accustomed probably to talk, and often to talk without thinking, have a kind of usefulness in the war after they have passed the fighting age (Laughter.) They have been referred to sometimes as the stokers of patriotism, but here in this organization no stokers are necessary to keep burning at white heat the sentiments of patriotism. (Applause.)

The causes of the war and the issues involved are well known. There is no room for difference of opinion as to the righteousness of our cause. Our country had no alternative. The choice lay between unthinkable humiliation and war. Our choice has been made, rightly made.

The fundamental truths upon which our government rests are irreconcilable with the con-

ceptions upon which the imperial German government has been erected. With us, the people are the source of power. All power is theirs. What has not been expressly granted to official authority to be exercised in their interests is withheld, and that which has been so delegated may be recalled at will.

That governments derive their just power from the consent of the governed is the proposition upon which our government rests. It was formed "to establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare" and to "secure the blessings of liberty" for all the people in all time. Unexampled progress in all things that make material and moral welfare has attended the one hundred and forty-two years of our independence as a nation. Our history is the best testimonial of the soundness of the fundamental truths upon which rests the Republic.

In Germany the conception is that the people derive their rights by concession or grant of the state. The doctrine of the divine right of kings has been applied. The strength of the state is the highest consideration. The safety of the people is deemed subordinate. The result is Prussianism, the demon enemy of the rights of men, the wicked offspring of false teaching. Moral precepts have been set at naught, and, in order that force may rule the affairs of nations and of men, relentless war is made on all civilization. It is a war of madness, and, notwithstanding skilled and scientific preparations for half a century, this madness is working—has all but consummated—the ruin of the German Empire and its people.

Were the rulers of Germany not mad, they would have known that their wicked incitement of Austria to attack and invade Serbia for the purpose of extension of power and territory, would bring on a European war. It was certain that Russia would stand with Serbia, and France was treaty-bound to Russia. The blow at France through neutral Luxemburg and Belgium, in violation of international law, and the solemn treaty obligation of Germany itself, was certain to bring the power of the British Empire to the performance of its treaty obligations. In short, if reason had not been overthrown by wicked teaching that as between na-

\*Address before the Southern Minnesota Medical Association, Winona, June 24-25, 1918.

tions there is no law, moral or otherwise, and that "scientific barbarism" can be so applied as to paralyze the world with fear, the rulers of Germany would have known that no civilized nation, no just man, would dare to attempt a justification or to be known as friend or apologist of the German imperial government.

By causeless murder of innocent civilians, by robbery of the defenseless, by arson, by vandalism, by piracy, by the pollution of wells, by the scattering of germs of deadly diseases, by falsehood, by spying upon and ruthless disregard of the rights of neutral and friendly nations, the Prussian state has for all time recorded itself as the barbarous enemy of mankind.

In 1914, Prussianism believed that its will could be by force imposed upon all the world. It was expected that France would speedily be overthrown; that England would not intervene; that the Balkan States and Russia, held back by the Austro-Hungarian Army, while the German Army worked its will in the west, could be conquered and exploited in detail without serious interference on the part of other European powers.

America was three thousand miles away, at peace with Germany, unprepared for war, long committed to the policy of avoiding European entanglements, and by German statesmen it was believed that she would not—that she dare not—come to the defense of humanity in Europe or defend the rights of her own people to travel upon the high seas. While our country preserved neutrality and was at peace with the world, German spies filled our public places; in impudent resentment of our exercise of our lawful right to trade with belligerents, Germany incited the destruction of our property, threatened our domestic affairs, and her minister at the nation's capital was the head of a highly organized conspiracy, liberally financed, to threaten and coerce our people and by political intrigue and false propaganda to torpedo our national power. American citizens were murdered upon the sea; our flag insulted; our ships on lawful business were sunk without warning; when reparation and cessation were demanded, we were met with hypocritical lies put forth by the highest German officials, while those who perpetrated outrages unspeakable were dignified and decorated by the imperial government.

This war is a defensive war, and this country was never engaged in an unjust war, and today behind its flag, behind its army, and behind its navy is a united sentiment, a sentiment more united than ever supported this country in any of its wars. (Applause.) It is now well known that false assurances were given by the imperial German government with the deliberate purpose of gaining time for the construction of more submarines in preparation for systematic, unlimited and ruthless destruction of American and other neutral shipping. In the meantime, her statesmen and ministers were insidiously and corruptly intriguing to bring our country into war with Japan and Mexico. Finally, about the first of January, 1917, this country was impudently notified that her ships would travel the seas at peril of being sunk without notice. By corruption hitherto unheard of, our people were assailed by false propaganda in the interests of Germany. America loved peace and was patient, was long-suffering and unprepared. Guileless in her intercourse with other nations, she was slow to believe evil of others. Protected by the expanse of ocean, she had long been accustomed to think herself secure. The Monroe Doctrine, boldly proclaimed in the early days of the Republic, had protected the continent from political exploitation and spoliation for more than a century. Conscious of our strength, we believed that such an invasion of our rights would not come. But the declaration by Germany of ruthless warfare upon our rights aroused America. America was in law and in fact invaded. Long after the war was forced upon her, she recognized its existence, and is now engaged in a war of defense, and I say to you with unqualified assurance that those of us who cannot go forward to fight do not propose to see our soldiers stabbed from behind. (Applause.) There can be no lukewarmness here. Real patriotism requires not only that America shall win, but that Prussianism, the Prussian state, the conceptions of false teaching, the immortality upon which it rests, must be torn up root and branch everywhere and forever. (Applause.) Such monstrous things should not be permitted to endure upon this earth.

Since 1914 the armies and navies of France and England have borne the brunt of battle. Theirs has been the privilege and the burden.

of defending the democracy, the civilization, of the world against ruthless autocracy. If they had failed, the attack speedily would have fallen upon the United States. In this age there is not room enough on the earth for the application of America's governmental conceptions and those of imperial Germany. (Applause.) One or the other must prevail. Germany was the first to recognize this. She has long looked with envy upon this country. If Germany had been prepared for war when Dewey entered Manila Bay, when our country was at war with Spain, she would have interfered against us. Then, Germany only waited the day. If Germany had been ready when President Roosevelt warned her battleships from Venezuela, war would have ensued to overthrow the Monroe Doctrine, in order that she might impose her will on South America and later upon all America. It is obvious now that since the early days of the present war, America has been the special object of the hatred of imperial Germany. The egotism of the Kaiser—which amounts to mania—led him to believe that through insidious propaganda and a highly organized spy system, he could debauch our people, control our internal politics and incite revolution here. But the spirit of America, the spirit of democracy, has made loyal Americans of by far the greater number of former subjects of the Kaiser. (Applause.) Men of German ancestry, native here, were, with few exceptions, found to be loyal when the real issue was made obvious to them. (Applause.)

Occasionally yet there are manifestations of German intrigue and attempts, by misrepresentation, to becloud the issue. But let the warning be sounded that loyalty in full measure will be exacted from all. (Applause.) Traitors and the lukewarm will be found out, and woe to them when discovered. Let it be understood that the detractors of country and bearers of hypocritical German representations are traitors, and that they will be dealt with as such. (Applause.) All must follow the leader. The leader is the Commander-in-Chief of the Army and Navy of the United States. (Applause.)

We have been at war but little more than a year, yet all have become accustomed to changed conditions. The occupation and pastimes of peace have given place to preparation

for war—actual war. Every one is and must be engaged in an effort to bring success to our arms that we may have permanent peace. In every walk of life is preparation and support for the effort that is to destroy the power of imperial Germany. From every walk of life come men to serve, to fight. We have seen them leave their homes; we have seen the laden troop trains move them to training camps; from the training camps we have seen them move to concentration camps, then down to the sea, and with anxiety we have awaited news of their safe arrival abroad. America has sent and is sending her best men, and enough will go to do the job. (Applause.) In the history of transportation of troops by sea, the performance of America has never been equaled. The pressure of our splendid Navy made itself felt by the enemy the moment we entered the war, and the pressure of our soldiers over there is now being felt. The time will soon come when enemy advance will cease forever, when the enemy will yield, give ground and finally retreat. (Applause.)

This war will not end until it ends right. It will not end until the German autocracy is destroyed. (Applause.) He is not a good American who only insists that America shall win, while secretly hoping that Germany may be saved. America must win, and imperial Germany must be destroyed. Justice requires that the Prussian state and the conceptions upon which it rests—the divine right of kings, the right of the state is limited only by its power to impose its will upon others, the strength of the state is more important than the rights of people,—must now be destroyed, root and branch. The world must be cleansed of such monstrous things.

After the war is ended, when the job is done, the men—whether it be one or two or three or ten millions—who went forward on sea and land to make, if need be, the full sacrifice for righteousness in the world, will return. America will welcome them home. This is their country. Taught by experience, serious and most trying, dignified and ennobled by splendid performance in the cause of human liberty, they will be entitled to receive, and they shall have, freely of the homage of their countrymen. (Applause.)



The political and economic problems which may arise in this country and all parts of the world as consequences of the war are likely to be difficult and supremely important. Certain it is that all the nations engaged will be greatly burdened by debt. The payment of interest regularly and of the principal in due time will burden industry. All will be relatively poor, but the need of saving will stimulate industry, and it is not unlikely that production of wealth will be greater than ever before. Injustice in the distribution of the products of toil and human effort will not be tolerated. The men who shall have borne the burdens of war will stand firmly for justice to all. (Applause.) Neither the excesses of socialism nor the privilege of wealth will be permitted to rule. It will be out of harmony with the spirit of the times to be idle, whether poor or rich.

A better understanding of the rights and duties of citizenship will everywhere prevail. There will be no classes; all will be free Americans. Returned soldiers will be entitled to be heard. They will be heard from the places of influence and power for decades to come. They will be heeded in all matters that concern the welfare of the country. As in the hour of national crisis and supreme peril we now turn to them, so then shall we give them our confidence. Through them will be erected a better, a broader, a nobler devotion to country than hitherto has been known. The spirit of a world ruling democracy, sane and just, will inspire all to discharge the onerous responsibilities of the future. (Applause.)

When the war is ended, America—having from the day of her birth been the refuge, the hope and the inspiration of free men everywhere—will occupy a high place in the family of nations. (Applause.) America is now showing, and until this war is ended will show, that she is true to the ideals of liberty which gave her birth. While this nation does not, and will not ask praises, indemnity or reward, humanity will ever turn to her as the world's best and greatest benefactor. (Applause.)

We propose to see this war through. No pledge to strengthen is needed. The nation's purpose is permanent. America's power cannot be overcome; it will prevail. (Loud applause.)

# REPORT OF THE MEETING OF THE FOREIGN MEDICAL MISSION AT THE UNIVERSITY OF MINNESOTA, OCTOBER 29, 1918.

ROBERT EMMETT FARR, M. D.,  
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On Tuesday, October 29th, a medical mission, composed of eminent surgeons representing our European Allies, was received in joint meeting of the Hennepin and Ramsey County Medical Societies at the University of Minnesota. In the absence, on account of sickness, of Dr. Robert Earl, President of the Ramsey County Medical Society, of St. Paul, Dr. E. K. Green, President of the Hennepin County Medical Society, of Minneapolis, welcomed the surgeons in the name of both societies.

Dean Lyon of the Medical School had charge of the program and addresses were given by Col. Geo. E. Gask, St. Bartholomew's Hospital, London; Major Pierre Duval, Paris; Col. Raffaele Bastianelli, Rome; Sir Thomas Myles, Dublin; Maj. G. Grey Turner, Newcastle-on-Tyne, England; and Maj. Geo. Emerson Brewer, New York.

It was a memorable occasion and a rare privilege to have this first-hand account of the activities in the medical field at the Front, and, while much of the discussion related especially to the carrying on of the war from a medical standpoint, the greatest interest was aroused by the reports of the world renowned surgeons, Professors Duval and Bastianelli, on the manner of treating lung injuries. Professor Bastianelli acted as interpreter for Professor Duval, who spoke in French. Col. Geo. E. Gask related the manner of handling the injured. Sir Thomas Myles dwelt especially upon the problems of reconstruction, and Maj. G. Grey Turner upon the manner of handling the Mesopotamia campaign—showing the almost insurmountable obstacles that had to be overcome—while Maj. Geo. Emerson Brewer electrified the audience with an account of the activities of our own forces "over there," dwelling especially upon the work of our medical officers and recounting many of the atrocities of the Hun.



*Remarks of Col. Geo. E. Gask.*

Col. Gask made a diagram showing arrangement of forces, Regimental Aid Posts, Advance Dressing Stations, Casualty Clearing Stations and Base Hospitals. He said success in handling the work at the Front depends largely upon expedition, and the whole subject is largely one of transportation. The wounded are brought first to the Regimental Aid Posts in charge of Regimental Aid Surgeons. These are as close as possible to the Front and are placed wherever temporary shelter may be had. From these points the wounded are carried back to Advance Dressing Stations. From these posts ambulance service collects the wounded and carries them back to the main Dressing Station, and from there, to what is known as the Casualty Clearing Station, which corresponds to our Evacuation Hospital. The distance of the Advance Dressing Station from the Front varies from a thousand to four thousand or five thousand yards, according to condition of the roads. Going was so difficult last year that the patients were carried by two bearers, shoulder high, instead of four. They are of course subject to fire. The losses in this service are second only to those of the infantry, and the difficulty of maintaining the service may readily be guessed. Ambulance trains carry the wounded back to the Base Hospitals, which are situated more or less on the sea coast, and the men are taken from there across the Channel to England. This gives an outline of the transportation required.

The idea in the beginning was that most of the surgery would be done at the Base Hospitals, but it was soon noted that every wound suppurated, gas gangrene set in and hundreds were lost. Gradually all urgent surgery was undertaken at the Casualty Clearing Station, and finally abdominal and head operations were done. The earlier the wound is cleansed by operation the quicker and better the recovery, so, gradually the bulk of the surgery was taken from the Base Hospital, and the Casualty Clearing Station has become the most important of the lot. It is here that the casualty lists are compiled. As many as from five hundred to three thousand men may pass through in a day.

In the operating rooms several teams work at the same time, everything being arranged

for the most rapid work, so that as little time is consumed as possible. From the first the work in our service has been too great for the number of surgeons. Cure, subsequent treatment and convalescence are governed by the care received.

Along with earlier surgical attention every known antiseptic was used to combat suppuration, which is horrible in such cases. Better cleansing, aseptic conditions and development of the Carrel-Dakin method improved conditions. Lung wounds had to be excised and dead tissue cut away. The practice now is early medical cleansing and surgical operation as soon as possible. After that the wound can be closed by (1) primary suture, (2) delayed primary suture, or by (3) secondary suture. Delayed primary suture enables one to move the wounded back at once. If first cleansing is unsuccessful, or in cases of fracture, they can be cleansed by chemical methods—the Carrel-Dakin, mostly. Delayed primary suture can be accomplished in two or three days at the Base Hospital, or closure made later by secondary suture.

*Remarks of Maj. Pierre Duval.*

(Interpreted by Col. Bastianelli.)

Maj. Pierre Duval (University of Paris) stated that "lung and chest wounds," at the first part of the war considered the most innocent, are now regarded much more seriously, the total death rate from the first dressing stations being 45 per cent in the French army, the same in the English, while the Italian army shows 60 per cent. (Col. Bastianelli—aside—"I do not believe this.") (Applause and laughter). Being confronted by such a high death rate, surgeons undertook the early treatment of lung wounds by operation in the same way wounds were handled in other parts of the body—by removal of foreign bodies, bits of clothing, excision of devitalized tissue, suture of lung wounds and complete closure of the chest. We deal with these wounds in a very simple way. Complicated apparatus is not necessary. We open largely the thorax, pull out the lung and cleanse it as if it were any other part of the body. It is necessary to pull out one lobe after the other, examine both surfaces, the wound has to be laid open, and the

margin excised. If hemorrhage occurs it is as easy to put a clamp on as in any other part of the body. The wound can be sutured and the lung replaced. Our experience shows that to open largely the thorax and use pneumo-thorax is not in any way dangerous, nor is it especially difficult. That this procedure is indicated is shown by comparison between lung wounds treated surgically and those treated medically. In 1916 at the Battle of Somme, three hundred such cases treated without operation showed a mortality of 30 per cent. In 1917 non-operative treatment showed a mortality of 14 per cent, while treatment with operation showed a mortality of only 9 per cent. Hemorrhage is inimical to operation but forty-nine cases with hemorrhage shows 66 per cent cured. Operations for other conditions than hemorrhage shows no deaths. Moreover, the quality of cure obtained by operation is infinitely superior to the cures without operation."

Lantern slides were shown to illustrate the method of procedure in such cases, also serial studies of cases with and without post-operative complications.

*Memarks of Col. Raffaele Bastianelli.*

"To the surgically trained, Maj. Pierre Duval's procedure of opening largely the thorax, exploring the lung, excising tissue and removing foreign bodies must appeal very much. It opens a broad field, but the question at once arises, is it for any case of wounds of the lung or not? This question has not been debated and, before forming an opinion, let me present another procedure. I am a surgeon. This procedure is not surgical, still it is good. The operation described by Maj. Duval is 'some' operation and requires 'some' surgeon. (Laughter). Instead, we put a needle inside the pleural cavity, a procedure that is an everyday business for every medical man. I am sure we have been enabled to register many lung wounds cured by this natural method of pneumo-thorax as practiced by your own eminent J. B. Murphy, and many others in this country and extensively used by men attached to my unit.

Two conditions present in these cases, one in which the thorax is closed and the other in which it is open. In one the lung is expand-

ing and contracting about as usual. In the open chest the lung is forced out in expansion, which gives a very difficult problem. In the closed chest the hemorrhage is usually very severe at once and very profuse at the beginning. It is a physiological question. Every movement of the chest wall produces suction. Negative pressure of the pleura keeps the lung wound open. Because of constant suction it cannot close easily and the lung is aspirated. In many cases even at the end of three or four days there is a large amount of blood in the pleural cavity.

In addition to this condition of the lung, contusions are frequent. Beside the hemorrhage (demonstrable in about 90 per cent of cases) air is present in the pleural cavity. Thus it happens that with each inspiration the lung comes out and forms a natural pneumo-thorax. Usually in the presence of air and blood in the pleural cavity, air is noted first. Blood may present at different times, sometimes early and sometimes quite delayed.

Lung wounds are cured by nature because the wounds close. The edges of the lung wound are approximated by pressure inside the cavity, either by blood or air, or by the blood and air together. (Slide shown of case with large collection of blood which does not stop hemorrhage from lung wound). The quantity of blood may be from 15 to 500 C. C. Such an accumulation of blood produces inflammatory complications, so it is aspirated and the lung walled in so that partial expansion continues, but the pleura cannot follow every expansion of the chest wall. It results that it is the lung which has to follow the chest wall in the movements of respiration, so the lung wound will not close, even if there is a great quantity of blood, because it could not follow the expansion of the chest. Now, if adhesions take place, the healing goes on without interruption. The lung having got adhesions at this point will try to fill up the cavity by expansion, but it never comes back to where it was before. In such cases life is saved but one is unable to obtain a good quality of cure.

When the cavity is filled with air the lung is surrounded by totally collapsed tissues and every movement of the chest wall is acted upon by air which is elastic. The lung does not take

part at all, but remains collapsed. Varying amounts of air are employed, the edges of the wound come together and are closed mechanically by air. The lung remains fixed. By removing the blood, which is dangerous, and putting in the air, which is advantageous in every way, we close it air tight, producing pneumothorax. Now, we do not patch with pieces of rubber but put in one of these bags of air. By partial pneumo-thorax we can put the lung into immobility for ten to fifteen days. Naturally we have some complications but time is too short to deal with these. Our apparatus is very simple and it is not necessary to have the differential pressure of Saeurbruch and W. Meyer. With the use of air bags the danger of air embolism is avoided. The results shown are good for this class of wounds. Some are cured, as shown by X-rays. Figures are based on all such cases brought in. No selections were made.

Cases reported .....	370
Non-penetrative without lung adhesion....	43
Non-penetrative with lung adhesion.....	37
Penetrating chest with closed chest and lung wound .....	206
In all of these 7 deaths. (Applause).	
Treated with pneumo-thorax.....	88
Treated with pneumo-thorax and surgery..	188
In all of these 7 deaths.	
Lived without complications.....	177
Lived with complications.....	22

The bad results are in cases of open chests because infected. Of these we had eighty-four cases with nineteen deaths (22.6 per cent), which includes men who died on the way or were so bad they could not be treated at all. Seventy-six cases inappropriate for pneumothorax showed a mortality of 14.4 per cent. In the last thirty-five treated we had only two deaths. In two hundred eighty-two cases, eighteen deaths (6.2 per cent), so that the percentage in the Italian army is not worse than the others."

*Remarks of Sir Thomas Myles.*

Sir Thos. Myles talked on the magnitude of the problem of getting men back into service when the British have lost altogether 2,000,000 lives, and the medical corps has had to deal with something like 5,000,000 casualties, 732,-

000 since the beginning of the recent offensive. He stated that England lost more men than all the Allies combined.

"In the early days of the war it was deemed sufficient, when a man was discharged from the hospital, to send him back to depots where he was supposed to do light work. Now, command depots accommodating four to five thousand men are placed side by side with the general hospitals, where, by means of gymnastic apparatus, field sports, mechanical equipment, etc., the men are made fit, and get back to France as soon as possible. Rigid selection is made, excluding all cases demanding secondary operation for severed nerves, divided tendons, etc. The surgeons in charge are young men from twenty-eight to thirty-five years of age and their function is an extensive one as they must determine need for further operation. Those considered unfit are left for care by the civil population later, as his reclamation work belongs to the Ministry of Pensions and not to the medical corps of the army. The commandant is always a professional man who has left the army. This is essentially a therapeutic service, but we have from the first been hampered by a shortage of medical men."

*Remarks of Maj. G. Grey Turner.*

The talk of Maj. G. Grey Turner was accompanied by a series of slides illustrating the interesting campaign in Mesopotamia. Here, too, the difficulties of the campaign hinge largely upon transportation, everything having to be carried via South Africa, and the treatment of the wounded during the siege of Kut taxed their facilities to the utmost.

The bad condition of the roads demanded first attention. The canals were bridged, sanitary measures instituted, and drainage made possible by raising whole sites of hospital supply depots, etc., several feet. The work was done mostly by Indian engineers who could stand the intense heat. The feeding problem was great, as men could not go into open air at the accustomed hours for food. Malaria was prevalent and hard to combat. The equipment of the operating theatre was all of the best type and all helpers in the hospital, men and women alike, did the most heroic work under the most trying conditions.

*Remarks of Maj. Geo. Emerson Brewer.*

Maj. Brewer gave a resumé of seventeen months' experience in France, about seven months with the British army and the rest with the American Expeditionary Forces. He spoke principally of the conditions under which the men have to work, that of the regimental surgeons being the worst, but for the most part conditions were good, the men doing superb work in all posts. He gave details of team work at the main hospitals which enabled the surgeon and his staff to handle in a few hours from three hundred fifty to six hundred cases, the chief responsibility being selection of cases and decision of what was most urgent. The evacuation hospitals take as good care of their work as any civil hospital in Chicago, Minneapolis or New York.

"At all times they have three or four good surgical teams and at rush times men are brought in from other points and sometimes from sixteen to twenty teams are kept busy. The evacuation hospital must be situated at rail heads as they send out from two to four hundred cases twice a day. At Chateau Thierry the evacuation hospital was about forty kilometers from the Front.

Cases so bad they can't be transported to the evacuation hospitals are handled by mobile hospitals manned by surgical teams and equipped with complete X-ray and sterilization outfits. The field hospital is set up as near the Front as possible under tents or any improvised shelter, and it is necessary to use ambulances to the fullest extent to clear the Front. It may be from five to fifteen miles in front of the hospital where the bulk of the surgery is done. The field hospital is capable of taking care of from three to four thousand men, still, with

eight hospitals, even with sixteen or eighteen teams working, the men had to be transported by train to the Base Hospital, because if they had to await their turn it would be from thirty-eight to seventy-two hours before they could be given attention. In every case handled judgment had to be exercised as to what was most urgent in cases of multiple injury, all varieties of work often being demanded in a single case. The work at all times requires the best surgical judgment. I was consulting surgeon during the battle of Chateau Thierry and it is one of the most gratifying experiences of my life to note the superb results obtained in such a large number of cases. About thirty-five or forty per cent were closed by delayed primary suture. About eighty-five per cent of all wounds were able to be closed, and the percentage of gas gangrene so small that there were only thirty-two in all, and of these only eleven died. I would have anticipated that it would go into the hundreds. I am happy to say the men in all fields are getting a square deal—the very best we can give them. No organization can be perfect under these conditions, but, if we have another great battle in the near future, we should have even better results, and I am sure everything possible is being done at Washington to complete the organization and have an oversupply of men when the need comes."

Maj. Brewer gave an account of the bombing of the field hospitals by German airmen. Plainly marked hospitals, over which the Boche had been flying for six to fifteen months, were bombed extensively. In one area nine out of twelve of these hospitals, which had not been molested and whose location was well known to the enemy for many months, were bombed in a period of a few days.





# Minnesota Medicine

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## EDITORIAL

### SURGICAL ADVANCES IN THE WAR.

We are fortunate in being able to give our readers elsewhere in this issue a composite account of certain phases of war surgery presented at the University of Minnesota on October 29th by the visiting Allied Surgical Mission. The delegation was composed of eminent members of the medical profession from Great Britain, France and Italy. Great Britain was represented by Sir Thomas Myles of Dublin, Colonel George E. Gask of London, and Major G. Grey Turner of Newcastle-on-Tyne; Professors Pierre Duval and Henri Beclere, both of Paris, represented France; and Professor Raphael Bastianelli of Rome was the representative from Italy.

The occasion was one of great interest and importance, and to those who had the pleasure of hearing our distinguished visitors, the consoling fact must have been borne home that in

spite of all the frightful horrors which have marked it, the war has at least contributed a most brilliant chapter to the pages of surgery.

Vividly brought out by Professors Duval and Bastianelli, probably the most far-reaching advance in war surgery has been made in the method of treating injuries to the thoracic cavity. The ease with which, as has been demonstrated, the lung can be extruded from the thorax, the penetrating fragment of shrapnel removed, and the lung then replaced, opens up possibilities hitherto undreamed in the treatment of a great many pulmonary conditions.

The grounds upon which the advance in thoracic surgery has been evolved has recently been recalled by Sir George Makins writing in the British Journal of Surgery. First, upon observation of the favorable course taken in a certain proportion of the gross injuries in which the cavity of the thorax had been laid open, and the conviction gained that the more frequent fatal issues depended upon consequent infection of the cavity rather than upon the primary gravity of the traumatism. Secondly, upon confirmation of the views, so ably put forth by Macewen, that artificial arrangements for the maintenance of respiration are unnecessary in dealing with the opened thoracic cavity. Although the rules guiding intervention in cases of injury to the chest may still require some regularization, Makins points out that the experience gained of the value of operative measures in properly selected cases, and the safety with which they may be carried out, prove that a large field has been opened up to the civil surgeon in the future.

The zone of advance so well exemplified in the treatment of thoracic injuries has also extended in greater or less degree to every other branch of war surgery. In the case of compound fractures, for example, the treatment of the primary wound, the method of immobilization, the method of transport, and the common sense after-treatment, have all been placed upon an established, rational footing.

Extraordinary progress is also to be seen, as a result of the necessity forced upon us by war, in the great field of oral surgery. In cases of extensive destruction of the mandible and mouth, remarkable restitutions have been accomplished through the employment of most

painstaking plastic operation. It is a matter of some pride that to a large extent advances in this branch of surgery have been through the efforts of an American dentist, Major H. Kazanjian of the Harvard Surgical Unit. One has but to consult the recent reports of Kazanjian, Cole and others to be convinced of the fact that progress in this particular field reflects the highest credit on the art of restorative surgery.

Tuffier's adaptation of Carrel's method of temporarily maintaining the circulation in a divided artery by the introduction of a junction tube between the separated ends, in order to gain time for a gradual increase of the collateral circulation, has materially lessened the great danger of thrombosis during attempts to repair wounds of the large blood vessels.

In the progress made in surgically dealing with injuries to the central nervous system a large share of credit must be given the skilful work of the neurologist in localizing the site of injury and in determining the most favorable time for surgical intervention.

In all of these, as well as in other fields of surgical endeavor, such as in the surgery of the abdomen, the tremendous advances made will some day fill volumes. The details and the successive steps which have marked their progress must be left to the surgical texts of the future, but let us at this time not fail to realize the debt and pay the tribute due those members of our profession whose work, self-sacrifice and genius have thus gloriously contributed to the relief of suffering mankind.

#### **RED CROSS HOSPITAL WORK IN FRANCE.**

Both money and personal service have been lavishly spent by the American people in Red Cross hospital work in France. There are two kinds of these hospitals, those that are a part of the United States army evacuating system, and those that are not.

The first class numbers now about ten. These are designated as American Red Cross Military Hospital, No. 1, 2, 3, etc. These are in charge of a U. S. A. commanding officer but are administered by the Red Cross. The superintendent is a Red Cross representative; the supplies, food and construction work are all furnished by the Red Cross, but the personnel is furnished by the army.

It has been a part of the function of the American Red Cross to serve as the army's emergency depot. Anything the army wants from splints to hospitals, from diet delicacies to recreation huts, is supplied by them. So close, in fact, has been this co-operation between the Medical Corps of the Army and Navy and the American Red Cross that there has been much confusion in the public mind as to what was really army and what was Red Cross.

To the second class belongs the American Red Cross Hospitals, properly so-called. These now number fourteen. They may be navy hospitals, or hospitals for French and American soldiers connected with the French army evacuating system, or hospitals operated independently by the Red Cross for the wounded of the Allies. The army may take over any one of these at any time and convert it into an American Red Cross Military Hospital, if for any reason such a change has become advisable.

The American Red Cross has children's hospitals and hospitals for the tuberculous. Besides this, the Red Cross has some six hundred beds in its eight convalescent homes. Here every effort has been made to give officers and men something of that atmosphere of comfort and cheer that would be theirs if they were able to be furloughed home for their convalescence. All reference to their hospital sojourn is avoided. The men are given music, tea on the terrace, outdoor recreation, and in every possible way are made to forget war.

Hospital hut service in France includes two distinct branches of service. Hot drinks are dispensed; cigarettes, tobacco and chocolate are sold; music and entertainment are arranged; and a Red Cross library loans books and magazines. But in addition to this, the American women operating these huts are made hospital searchers whose task it has been to find out in more detail something of the wounded and killed and send this information to the families at home. These huts are a godsend in fighting the foe of homesickness, and in keeping up the spirits of those weakened by wounds.

Another interesting phase of hospital service in modern warfare has been the hospital on wheels, or the "autochir," as it has been nicknamed by Americans in France. There are also portable diet kitchens, disinfectant plants, dental ambulances, etc., all of which have moved

with the advancing army, ready to give aid at the earliest possible moment.

At first our own wounded men were billeted in the French hospitals in the sector in which they were fighting. More recently, however, they have been evacuated to our own hospitals where they have had the care and attention of American doctors and nurses.

The chief work of the American Red Cross recently has been in caring for our own wounded soldiers who have fought so valiantly in helping to bring the war to its successful issue. In close co-operation with the army, the Red Cross has worked to supply a sufficient nursing service. There are now in France about nine thousand graduate nurses in this service.

With the war's ending the task ahead still remains very great, and the American Red Cross will continue its work of mercy and relief. It needs the entire nation behind it. The Red Cross Christmas Roll Call is a summons to this national support.

Every member of the medical and nursing profession who wears a Red Cross button and displays a Red Cross Service Flag during Christmas Roll Call week has not only renewed his membership in the American Red Cross but he has reminded the American people of his renewed personal service.

### PROPHYLACTIC VACCINATION AGAINST PNEUMONIA.

Since advocating in last month's issue of *Minnesota Medicine* an unprejudiced trial of a correctly prepared vaccine as a prophylactic measure in the present epidemic of respiratory infections, we are pleased to note that the Acting Surgeon General of the United States Army has issued a bulletin to the surgeons of the American Expeditionary Forces and of the hospital encampments of this country to the effect that "the value of vaccination against certain of the more important organisms giving rise to pneumonia may be considered as established by the experimnts of Lister in South Africa, and by the more recent results of prophylactic vaccination in our own army."

Lister's results in South Africa have been striking. During the last four years he has

given prophylactic vaccination against the three most important types of pneumococcus there prevalent. In this period not a single case of pneumonia due to a pneumococcus of the types used in the vaccine has occurred among the vaccinated individuals, each of whom has, as a rule, been under observation for about nine months following the vaccination.

The Surgeon General's bulletin further gives the following facts: "In our own army vaccination was given last winter as a prophylactic measure to half of one division, using a vaccine containing pneumococcus types I, II and III. During the ten weeks from the period of vaccination until the troops went overseas, pneumonia due to these types of pneumococcus did not occur at all among the vaccinated troops; whereas, among the unvaccinated it occurred a trifle more frequently than in the period before vaccination.

"The army has now available for all officers, enlisted men, and civilian employees of the army, a like vaccine containing pneumococcus types I, II and III. The dose of this for prophylactic use is 1 cc. given subcutaneously and a single injection suffices. The reaction, local and general, is about comparable with that following typhoid vaccination; as a rule, rather less severe.

"In view of the possible etiologic importance of the bacillus influenza in the present epidemic, a saline vaccine has been prepared by the army and is available for all officers, enlisted men, and civilian employees of the army. The effectiveness of bacillus influenzae vaccine as a prophylactic measure in controlling the epidemic must be considered as still in the experimental stage. Being a saline vaccine it is probable that more than one injection will be required to obtain maximal protection. It may be given at the same time as the pneumococcus vaccine in the opposite arm. The reaction local and general of this vaccine is extremely slight.

"These vaccines may be obtained from the Army Medical School, Washington, D. C., on requisition made directly to the commandant, by letter or telegram.

"As these vaccines are now available for prophylactic use and are prepared by standardized methods, and as in the case of the pneu-

mococcus vaccine, the proper dosage and the protective efficiency have been established by the investigation conducted by the army, the vaccines obtained from the Army Medical School will be employed in the future in the army when pneumococcus of influenzae vaccines are desired, to the exclusion of any other vaccines prepared from these organisms.

"It must be understood that vaccination against influenza and pneumonia is not compulsory, and should be given only with the knowledge and consent of the individual."

**APPOINTMENTS MADE BY DR. GEORGE  
DOUGLAS HEAD OF MINNEAPOLIS,  
PRESIDENT OF THE MINNESOTA  
STATE MEDICAL ASSOCIATION  
FOR THE YEAR 1919.**

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Tomlinson:

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The Hospital Committee to Act in an Advisory Capacity to the Council on Medical Education of the American Medical Association:

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Dr. E. T. F. Richards - - - - - St. Paul  
Dr. L. A. Nippert - - - - - Minneapolis

**PHYSICIANS LICENSED TO PRACTICE IN  
MINNESOTA AT THE OCTOBER, 1918,  
EXAMINATION.**

Upon Examination.

Bacon, Donald Kay - - - U. of Mich., 1918  
Bowing, Harry Herman - - - U. of Pa., 1917  
Fritsche, Albert—

Chicago Coll. Med. & Surg., 1918  
Gleason, Archie Leland - - - - Rush, 1918  
Hawkins, Arthur David—

U. of Minn., M. D., 1919; M. B., 1918  
Rippert, James Albert—

Coll. P. & S., Baltimore, 1910  
Sawatzky, William August—

U. of Minn., M. D., 1919; M. B., 1918

By Reciprocity.

Barlow, Roy Alexander - U. of Mich., 1914  
Benedict, William Lemuel - U. of Mich., 1912  
Birkland, Olav Nelson - Northwestern, 1917  
Gammons, Herbert Francis - Boston U., 1909  
Lisor, Graham MacAllister - - Barnes, 1911  
Lyons, Horace Raymond - Northwestern, 1916  
Quigley, Timothy Charles - U. of Ill., 1908  
Simpson, Ellery De Witt - Johns Hopkins, 1912  
Ward, Archie Walter - U. of Nebraska, 1911

## OBITUARY

### DR. JAMES E. MOORE.

It is our sad duty to record the death of Dr. J. E. Moore of Minneapolis, which occurred on November 2, 1918, from pernicious anemia after an illness of six months.

Dr. James E. Moore was born in Clarksville, Pa., March 2, 1852. He was the son of Reverend George W., and Margaret Ziegler Moore. Dr. Moore attended the public schools of Pennsylvania, the Poland Union Seminary of Poland, Ohio, the University of Michigan, and Bellevue Hospital Medical College, receiving



his degree in medicine from the latter college in 1873. He spent the next two years in the hospitals of New York City, after which he located in Emlenton, Pa., spending six years there in the arduous practice of a country physician. In August, 1882, he removed to Minneapolis. In 1885 he went abroad for study in Berlin and London, and on his return in 1887 decided to devote his entire time to surgery. This he did exclusively since 1888, being the first specialist in surgery west of New York.

Dr. Moore had been connected with the Medical School of the University of Minnesota since its establishment in 1888, and was appointed chief of the Department of Surgery in 1908. After his retirement from private practice in 1915 he devoted himself to teaching and the work of the surgical clinic in the University Hospital.

He was a member of the American Surgical Association, being vice president in 1905; of the Western Surgical Association, of which he was president in 1902; a chairman of the Surgical Section of the A. M. A. in 1903; a member of the Southern Surgical Association; a member of the Judicial Council of the American Medical Association; a Fellow of the American College of Surgeons and a member of the Board of Governors; a member of the Societe Internationale de Chirurgia; of Sigma Xi; of the Minnesota Academy of Medicine, of which he was president one year; and of the local societies of the state and county. He belonged to the Minneapolis, the Minikahda and the Automobile Clubs.

#### MEMORIAL TO DR. JAMES E. MOORE

by the

ADMINISTRATIVE BOARD OF THE MEDICAL SCHOOL, UNIVERSITY OF MINN.

Another pioneer in medical education in the State of Minnesota and almost the last of the members of the original faculty of the Medical School of the University of Minnesota, Dr. James E. Moore, has passed on.

His death is deeply lamented by his fellows. They desire to record their keen sense of the loss of their old and tried friend and associate of so many years. They testify to his comradeship and constant co-operation; to his unfailing interest in the students he helped to train;

to the inspiration he has been and the guiding hand that he has given to young men in the profession; to the integrity of the surgical ideals for which he stood; to the rare success he realized as a teacher of surgery; to the large part that he has played in the making of medicine in the state and in the making of history in this school; to the long and faithful service he has rendered to the University of Minnesota.

In his life he lived the gospel of good work. At its close, with rare philosophy, he looked back, content to have lived so long and so happily, to have had so large a share in the world's work; and "sustained and soothed," and beseeching his friends not to think of him sorrowfully, he "approached his end, as one who draws the draperies of his couch about him and lies down to pleasant dreams."

His old associates salute the brave spirit that has departed and offer their sympathy to his family in their bereavement.

E. P. Lyon, Dean.

Richard Olding Beard, Secretary.

#### DR. FRANKLIN ELMORE BISSELL.

Dr. Franklin Elmore Bissell, who was an active member of the state society for many years, died at St. Barnabas Hospital on November 7th.

Dr. Bissell graduated in 1869 from the Charity Hospital Medical College of Cleveland, which later became the medical department of Western Reserve University. He came to Minnesota in 1871, settling in Litchfield, where he practiced medicine almost continuously, until he accepted an appointment as surgeon to the Minnesota Soldiers' Home in 1901. Two years later he retired, to live in Minneapolis. When but seventeen years old, he enlisted as Surgeon Steward in the U. S. Navy, and served on the river gunboat Lexington during the last half of the Civil War. He was the first president of the Crow River Valley Medical Society and was continuously re-elected to that office until he left Litchfield. Dr. Bissell was an early member of the State Legislature, and was always prominent in the civic activities of Meeker county. Dr. Frank S. Bissell, now practicing in Minneapolis, is a son.

## OF GENERAL INTEREST

The Board of Examiners for the Medical Corps of the Army has been transferred from Minneapolis to St. Paul, and is now quartered in the Army Building at Robert and Second streets, room 305.

Capt. Ralph St. J. Perry, M. C., is still president of the Board, though recently assigned to duty as Medical Officer of the Personnel Board, Chief of Staff Corps, for the Northwest District. Capt. Perry suggests that all newly commissioned officers of the Medical Sanitary and Dental Corps and Reconstruction Aides, call upon him by mail, telephone or in person, for assistance in matters of equipment, transportation, etc., as many are purchasing unnecessary equipment, getting wrong transportation, etc. The captain says that part of his work is to help clear up misunderstandings regarding orders for reporting, extensions of time and such matters, and is always ready to do what he can for those entering the service.

Dr. Earl Pfaff, formerly of Minneapolis, has located at Watkins, Minn.

Dr. E. T. Sanderson of Minneota, expects to locate in Granite Falls, Minn.

Dr. E. J. Batchelder of New Richmond, has sold his practice to Dr. F. D. Brandenburg, and has moved to Minneapolis where he expects to take up special work.

Dr. Anton J. Moe announces his permanent removal from Heron Lake, Minn., to Sioux Falls, S. D.

Dr. W. J. Moore and family left Wood Lake a few weeks ago for Adams, Minn., where he has bought and equipped a hospital and where he expects to continue the practice of his profession.

At a recent meeting of the county commissioners of Fergus Falls, Minn., Dr. G. T. Hangan of Battle Lake was elected a member of the County Tuberculosis Sanatorium to succeed Dr. Cole of Fergus Falls, resigned.

Dr. and Mrs. N. O. Sandven of Willmar, have moved to Paynesville where they expect to make their home for the winter. Dr. Sandven

is now in charge of the Pilon Hospital during the absence of Dr. Pilon who is on professional duties in France.

Dr. Henry Wireman Cook, Minneapolis, has been called to Washington to serve for six months as associate director of the Medical Service Bureau of the American Red Cross. At the end of this time Dr. Cook expects to return to Minneapolis.

Dr. M. H. Scheldrup, Minneapolis, received a commission as captain in the medical reserve corps a few days ago, and has been assigned to the base hospital at Camp Grant, Rockford, Ill.

Dr. O. H. Urstad, Kiester, left a few weeks ago for Camp Oglethorpe, Ga., where he has been assigned for duty as a captain in the medical reserve corps.

Dr. H. G. Blanchard, a member of the draft board from Waseca county, has been commissioned a lieutenant in the medical reserve corps.

Dr. H. N. Schmidt, a well known Westbrook physician, died at his home on Thursday, October 24th, of influenza.

Dr. W. F. Holden, for many years a practicing physician in Minnesota, died at his home in Winona on October 27th at the age of sixty-seven.

Dr. George Ulrich Panzer of Truman, died on October 22d from pneumonia following an attack of influenza. He is survived by his widow and two children.

Dr. D. J. McMahon of Raymond, has moved to Breckenridge where he has taken charge of the practice of Dr. E. W. Rimer who is now in France.

Dr. E. M. Howg, who has been associated for a number of years with the Mayo Clinic at Rochester, has taken charge of the Murray County Hospital during the absence of Dr. Richardson and Dr. Benoit, now in the United States army service.

Announcement was recently made by the Northern Division of the Red Cross of the appointment of Dr. H. W. Hill, secretary of the St. Paul Public Health Association to take charge of all relief work among fire and in-

influenza sufferers in Northern Minnesota. Physicians were chosen from the Adjutant General's office and nurses from the Red Cross. Plans for establishing hospitals at various points in Northern Minnesota are being made.

Dr. F. C. Rodda, assistant professor of pediatrics at the University of Minnesota, left Minneapolis a few weeks ago for New York expecting to leave for France soon where he will take up Red Cross work underway in children's hospitals behind the battle lines.

The marriage of Dr. William Benton Wright, Jr., St. Paul, and Miss Mabel Cooper, also of St. Paul, was solemnized on Saturday, November 2d, at noon at the Cathedral residence, Rev. Lawrence F. Ryan officiating. Dr. Wright is staff physician at the City and County Hospital and Miss Cooper is a graduate of Wellesley College and has been active in social and philanthropic activities in St. Paul since the completion of her college course.

Dr. and Mrs. A. E. Kessler, Battle Lake, superintendent of the Otter Tail Sanatorium, left for New York a few weeks ago expecting to embark for Italy within a short time. Dr. Kessler will be engaged in tuberculosis work for the Italian government.

Dr. Henry Binet and Miss Mae Benton, both of Grand Rapids, were married on October 23d, at St. Joseph's Catholic Church.

Dr. D. J. Paradine of Cloquet, who was in charge of the medical relief work at Cloquet and Carlton during fire week, recently opened a base hospital at Floodwood for the care of the fire sufferers and influenza cases. Dr. Paradine intends to make a health survey of the locality and conduct an educational campaign on the influenza in addition to the medical relief to be immediately afforded under the direction of Col. H. V. Eva of the commission and Commissioner Cook. Dr. Paradine's medical library and all his instruments were lost in the Cloquet fire. He has disregarded his own losses and has spent his time since the fire in continuous service to the sufferers.

Dr. J. A. Evert of the Northern Pacific Railroad Hospital, Brainerd, has been called to service and will be in the medical corps where his long experience in hospital work will be of essential benefit to the government.

Dr. W. P. Lee, Northfield, who was recently commissioned a lieutenant in the medical reserve corps, has been promoted to captain with orders to report at Ft. Riley, Kan.

Dr. John D. Utley, St. Paul, was recently appointed a captain in the medical reserve corps and has left for Camp Custer, Battle Creek, Mich.

Under date of October 23d, we have received from Dr. R. O. Beard, Assistant Dean of the University of Minnesota Medical School, notice to the effect that the senior medical students who accompanied the University Base Hospital to France were not given their degrees on board ship as previously erroneously stated. They very recently have been recommended for the degree of Bachelor of Medicine, which degree, the Board of Regents, at its October meeting, voted for them.

Owing to the epidemic of influenza and to the great number of physicians in service, the executive committee of the Southern Minnesota Medical Association decided not to hold their annual session as planned, on November 25th and 26th. The date on which the meeting will be held has not yet been announced, but all members will be notified as soon as the date has been definitely decided upon.

Dr. Oliver S. Olson, West Duluth, recently received a commission as lieutenant in the medical reserve corps and was ordered to report for duty at Ft. Riley, Kan.

Dr. Frederick N. Solsem, who has been practicing for some time at Brooten, has decided to locate at Sacred Heart and will occupy the offices formerly occupied by the late Dr. Hammerstrand.

Dr. J. V. Johnson, formerly of Duluth, is now with the Third Battalion, Forty-third regiment, Fifteenth division, at Camp Logan, Tex., as battalion surgeon.

Dr. Frank S. Bissell of Minneapolis, was elected vice president of the American Roentgen Ray Society, at a recent meeting at Camp Greenleaf.

Dr. Harold J. Rothschild, St. Paul, left a short time ago for Ft. Riley, Kan., where he has been assigned to duty after receiving a commission as lieutenant in the medical reserve corps.

At the regular meeting of the city commissioners of St. Cloud, held recently, Dr. C. S. Sutton was appointed a member of the Board of Health to succeed Dr. Beaty, who was appointed city physician and chairman of the board to succeed Dr. J. P. McDowell, who resigned to enter military service. The addition of Dr. Sutton to the board completes the health organization, with Dr. J. H. Beaty as chairman, and Dr. J. C. Boehm and Dr. Sutton as associates.

Dr. W. S. Muirhead, Floodwood physician, lost his life in the recent fires which swept the northern part of the state. After a search lasting twelve days his body was found and identified by his brother-in-law who was a member of the searching party.

Dr. C. C. Blakely and Dr. H. W. Covey of the State Hospital staff, St. Peter, have been given commissions as captain and lieutenant, respectively, in the medical reserve corps. They were ordered to report for duty to Camp Cody, Deming, N. M.

Maj. Clyde E. Prudden, one of Duluth's best known physicians and a member of the old Third Minnesota Infantry, died of pneumonia, in the early part of October, according to word received by his parents. A letter dated October 11th, written by Chaplain C. W. Ramshaw, stated that Maj. Prudden was taken ill on September 26th, three days after their departure from New York and died as their ship came into port.

Dr. F. L. Hammerstrand of Sacred Heart, died on October 20th of pneumonia following influenza. Dr. Hammerstrand had been called to New York to see a brother also ill and while on the way contracted the disease which resulted in his death.

Dr. Hammerstrand was born in East Linn, Ill., on October 11, 1881. He attended the Augustana College at Rock Island, Ill., and in 1905 entered the College of Physicians and Surgeons, Medical department of the University of Illinois, from where he graduated in 1909. He then served as interne at the Michael Reese Hospital, Chicago, for two years. In the fall of 1911 he located at Sacred Heart where he practiced up to the time of his death.

His funeral was held on October 23d, at Paxton, Ill., the home of his parents.

Dr. N. H. Beal, Rochester, died on October 27th, at Rochester, of influenza.

Dr. Beal's home was at London, Ontario, where he had been assistant professor of surgery at the Western University of London. Six weeks previous to his death he became associated with the Mayo clinic at Rochester.

Dr. Beal was thirty-six years of age and is survived by his widow and two daughters.

Dr. J. Edwin Olander, well known St. Paul physician, died on October 25th of pneumonia following an attack of influenza.

Dr. Olander was born in Marinette, Wis., May 9, 1877. He attended Augustana College at Rock Island, Ill., and graduated from there in 1896. He later entered the University of Minnesota Medical School and graduated from there in 1904. He was a member of the Sigma Psi fraternity, the American Medical Association, and the Minnesota State Medical Association.

Private funeral services were held on Saturday afternoon, October 26th, and interment took place at Lakewood cemetery, Minneapolis.

Dr. S. A. Berg of Granite Falls, passed away at his home on Friday, October 11, 1918. His death was due to influenza complicated by pneumonia.

Dr. Berg was born on May 25, 1880. He attended St. Olaf College, the University of Minnesota, and in the fall of 1901 entered Rush Medical College, Chicago, from where he graduated in 1905. He then located in Maville, N. D., coming to Granite Falls in 1914, where he practiced up to the time of his death.

Dr. Albert G. Alley died at Minneapolis on October 23d, of influenza.

Dr. Alley was born on October 21, 1880, at Grove City, going to Buffalo in 1887 where he attended the public schools and graduating from the high school in the spring of 1899. He entered the State University in the fall of the same year. He later entered the medical department of the University from where he graduated in 1905. The following year he spent as an interne in St. Joseph's Hospital, St. Paul. He then practiced at Kilkenney, Minn., for about three years and at Granger,



Wash., for about seven years. He then returned to Minneapolis where he entered upon a three years' course at the University for the purpose of fitting himself as a specialist in children's diseases. This course was not quite completed at the time of his death.

Dr. Alley recently received an appointment as lieutenant in the medical reserve corps, but had not as yet been ordered into active service. Pending such orders he had been doing government work assisting in the physical examination of members of the Students' Army Training Corps at the University of Minnesota.

His remains were taken to Buffalo for interment.

Dr. T. W. Hovorka of St. Cloud, was claimed by death on the evening of October 16th. Dr. Hovorka had been ill with influenza for about a week when pneumonia developed resulting in his death.

Dr. Hovorka was born at New Prague in 1874 and during his early years attended the local schools. At the age of sixteen he entered St. John's University at Collegeville and later graduated from the Pharmacy Department of the University of Minnesota. The following two years he engaged in the drug business in St. Paul. In 1899 he entered the Hamline University, to take up a course in medicine and graduated from there in 1902. In 1908 he took a post-graduate course in surgery at Harvard University. On his returned he located in Glencoe where he practiced until 1916. Two years ago he moved to St. Cloud where, in a very short time he built up a lucrative practice and ranked as a leading physician and citizen of that city.

Kiester, Minn., is now without a physician. A good opening exists there for the right man who wishes to build up a general practice.

Dr. Charles Swenson, Braham, Minn., whose work among the fire sufferers at Moose Lake exposed him to the prevailing epidemic, was forced to take to his bed for a few days with influenza. We are glad to hear, however, that he is fortunately now quite well again.

Dr. E. M. Jones, St. Paul, now stationed at the Walter Reed Hospital, Washington, D. C., has recently been promoted to the rank of major.

Dr. Robert W. Archibald, formerly of Lake City and Winona, and later of the Division of Sanitation, Minnesota State Board of Health, has been commissioned a lieutenant in the Sanitary Corps, U. S. A., and is stationed at New Haven, Conn., where he is taking a course in special training at Yale University.

We deeply regret to record the recent death in France from pneumonia of Lieut. Oscar M. Klingen. Dr. Klingen was a member of the University of Minnesota Base Hospital No. 26, France, and previous to his entering active service held the rank of assistant in surgery at the University of Minnesota.

## NEW AND NON-OFFICIAL REMEDIES

During October the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion with New and Non-Official Remedies:

**Hynson, Westcott and Dunning:**

**Lutein Tablets, H. W. and D., 2 grains.**

**Eli Lilly and Company:**

**Pneumococcus Antigen (Rosenow), Lilly.**

## NEW AND NON-OFFICIAL REMEDIES.

**Solargentum-Squibb.**—A compound of silver and gelatin containing from 19 to 23 per cent. of silver in colloidal form. It is used in solutions containing from 1 to 25 per cent. or more. It is also used in the form of bougies or suppositories. No precipitate is produced when sodium chlorid or albumin solutions are added to solutions of solargentum-Squibb. E. R. Squibb and Sons, New York. (Jour. A. M. A., Oct. 12, 1918, p. 1219).

**Benzyl Alcohol—Phenmethylo.**—An aromatic alcohol occurring as an ester in tolu and other balsams, and produced synthetically. It is being used as a local anesthetic by injection and by application to mucous membrane. It is said to be practically nonirritant and nontoxic in the ordinary concentration and dosage. From 1 to 4 per cent. solutions in physiological sodium chloride solution are commonly used for injection anesthesia.

**Phenmethylo.**—A nonproprietary brand of benzyl alcohol complying with the tests and standards for benzyl alcohol. Hynson, Westcott and Dunning, Baltimore, Md.

**Phenmethylo Ampules, 1 per cent. H. W. and D.**—Each ampule contains 5 Cc. of a sterile solution of phenmethylo H. W. and D. 1 Gm. in physiological sodium chloride solution 99 Gm. Hynson, Westcott and Dunning, Baltimore, Md.

**Phenmethylo Ampules, 2 per cent. H. W. and D.**—Each ampule contains 5 Cc. of a 2 per cent. solution of phenmethylo H. W. and D. in physiological sodium chloride solution. Hynson, Westcott and Dunning, Baltimore, Md.

**Phenmethylo Ampules, 4 per cent. H. W. and D.**—Each ampule contains 5 Cc. of a 4 per cent. solution of phenmethylo H. W. and D. in physiological sodium chloride solution. Hynson, Westcott and Dunning, Baltimore, Md. (Jour. A. M. A., Oct. 19, 1918, p. 1313).

**Pneumococcus Antigen (Rosenow), Lilly.**—A pneumococcus vaccine prepared by digesting a suspension of pneumococci until the bacteria are partially autolyzed. E. C. Rosenow believes that the protective power of this vaccine is greater than that of one prepared in the usual way. It is marketed in 5 Cc. vials, each Cc. containing 20 million partially autolyzed pneumococci. Eli Lilly and Co., Indianapolis. (Jour. A. M. A., Oct. 26, 1918, p. 1407).

### PROPAGANDA FOR REFORM.

**Vaccines in Influenza.**—After study of the evidence as to the value of vaccines against influenza, the Massachusetts committee recommended that the state encourage the distribution of the influenza vaccine intended for prophylactic use but in such manner as will secure scientific evidence of the possible value of the agent. It reported that the use of the vaccine should be considered experimental, and recommended that the state shall neither furnish nor endorse any vaccine used for the treatment of influenza. (Jour. A. M. A., Oct. 19, 1918, p. 1317).

**Phillips' Phospho-Muriate of Quinine Comp.**—The Council on Pharmacy and Chemistry reports on the extravagance and the absurdity of the claims made for Phillips' Phospho-Muriate of Quinine Comp. by the Charles H. Phillips Chemical Co. It concludes that the preparation is a complex and irrational mixture exploited by means of unwarranted claims, and a survival of the days when fantastic formulas were gravely published, when eminent practitioners gave glowing testimonials for lithia waters that contained none, when no therapeutic claims were too preposterous and no theory too nonsensical to justify the use of all manner of clap-trap mixtures. It is explained that Phillips' Wheat Phosphates was introduced when numerous ailments were supposed to be due to a deficiency of phosphorus in our food, and that it was converted into "Phospho-Muriate of Quinine Comp." by the addition of iron, quinin and strychnin. (Jour. A. M. A., Oct. 19, 1918, p. 1335).

**Ill Advised Public Health Articles.**—A "syndicated" newspaper article which discusses Spanish influenza advises that "aspirin may be administered to relieve headaches and body pains." No doubt it would be to the interest of public health and the public pocketbook were medicines taken only on the advice of physicians. The objections to the lay use of aspirin was thus stated by the Council on Pharmacy and Chemistry: The public does not know, as phy-

sicians do, that headaches are merely symptoms of other, sometimes very serious conditions, and that they are often the signal for the need of a thorough physical examination and diagnosis. It is true that they are often also the symptoms of very minor derangements, which will right themselves spontaneously; and that, in such cases, drugs like aspirin may give relief and may do no harm. The patient, however, is not educated to distinguish one class from the other, and therefore anything that tends to promote the indiscriminate use of such remedies as aspirin itself is not always harmless. Alarming idiosyncrasies are sufficiently common that the use of the first doses, at least, should require medical supervision. (Jour. A. M. A., Oct. 19, 1918, p. 1337).

**Serums and Vaccines in Influenza.**—Unfortunately, we as yet have no specific serum for the cure of influenza and no specific vaccine or vaccines for its prevention. The various treatments now being tried are experimental and their value will not be known until all the results are collected, which probably will not be until the epidemic is over. As to serum treatment, the only noteworthy new method so far is the injection in severe cases of influenzal pneumonia of the serum of patients who have recovered from such pneumonia. (Jour. A. M. A., Oct. 26, 1918, p. 1408).

**Sulpherb.**—"Sulpherb" or "Sulpherb Tablets" is one of the nostrums sold by the Blackburn Products Company of Dayton, Ohio. It is advertised by the "fake prescription" method. It is claimed that the tablets contain the extracts or concentrations of cascara, aloes, may apple, nux-vomica, black cherry, capsicum, ginger, sarsaparilla, and also calcium sulphide, sulphur and cream of tartar. An examination made in the A. M. A. Chemical Laboratory indicated that "Sulpherb Tablets" are probably compounded from calcium sulphid, sulphur, cream of tartar, and vegetable extractives. Of the vegetable extractives claimed to be present, aloes was indicated and a trace of some alkaloid, the amount of which was too small to permit its identification. (Jour. A. M. A., Oct. 26, 1918, p. 1431).

### NOTICE.

#### NO MORE PHYSICIANS TO BE COMMISSIONED IN THE MEDICAL CORPS.

At ten o'clock on the morning of Nov. 11th, the War Department discontinued the commissioning of physicians in the Medical Corps.

This condition, in all probability, is permanent and no further consideration will be given applicants for a commission in the Medical Corps until further notice.

## PROGRESS IN MEDICINE AND SURGERY

**PERICHOLECYSTIC ADHESIONS DYSPEPSIA, AND ITS DIAGNOSIS:** G. A. Friedman (N. Y. Med. Jour., Feb. 23, 1918) states that his object is to deal with a group of patients commonly called dyspeptics who have been treated for indigestion for long periods until an exploratory laparotomy reveals the presence of pericholecystic adhesions with or without an accompanying cholecystitis. He divides the patients into several classes according to the predominating symptoms:

1. Typical history of gallstone colic without jaundice, but at operation only pericholecystic adhesions are found and gallbladder is pronounced normal by the pathologist.

2. A typical history with vague and indefinite symptoms; slight attacks of epigastric pain, either associated with meals or independent of meals, may be diagnosed gastric ulcer; at operation only pericholecystic adhesions.

3. Ulcer group. Here a history typical of gastric or duodenal ulcer is elicited. The stools may give positive gualac test, or occasionally there may be vomiting of blood. Ulcer treatment is of no avail. Operation reveals pericholecystic adhesions and not ulcer, though occasionally ulcer is present, too.

4. Appendicular group. This comprises patients who have been operated because of symptoms typical of appendicitis; appendix is found normal; months later the same symptoms recur; a second operation reveals adhesions, not around the caecum, but pericholecystic adhesions.

5. Unusual conditions found in patients with pericholecystic adhesions, such as hour-glass stomach, obstruction of intestines, adhesions of gallbladder to serous coat of appendix, or pyloric obstruction.

In the previous groups pain is the predominating characteristic, but in this last group dyspepsia is the chief symptom and pain is absent.

A very important diagnosis aid in the dyspeptic class is the presence of tender spots, on deep pressure, to the right of the spinal column posteriorly, between the 7th and 11th ribs.

On deep (not superficial), pressure the patient reacts with pain at some spot within this region, but the whole area is not sensitive.

The corresponding area on the left side is always tested for comparison. If, on repeated examinations, the findings are constant, it is pathognomonic of pericholecystic adhesions, with or without cholecystitis. Furthermore, these deep pressure points cannot be elicited from dyspeptics free from pericholecystic adhesions.

The author makes no claim to having discovered anything new but merely wants to emphasize an important sign never before utilized in obscure cases of pericholecystitis.

As a further diagnostic aid the X-ray is of value and this will demonstrate a high-lying stomach with the pylorus drawn to the right, and a 6-8 hour residue.

The author, however, puts more reliance on the tender pressure spots than on the X-ray findings as he has had experience with the X-ray (common to us all) in which positive signs were negated at operation.

CHARLES N. HENSEL.

**IS PURGATION OF PATIENTS BEFORE OPERATION JUSTIFIABLE?** Walter C. Alvarez (Surg., Gyn. and Obs., June, 1918) attacks this pre-operative routine as an irrational relic of primitive medicine, and shows how it has persisted without scientific foundation.

He points out that the small intestine is usually empty in from seven to nine hours after a meal and rarely contains food after fifteen hours, consequently, since most operations are performed in the morning, twelve to eighteen hours after the dinner of the previous evening, the small intestine is empty and the only place for feces to stagnate is in the colon.

In most cases the colon would empty itself spontaneously on the morning of the operation; failing that, an enema would suffice.

By radiographing patients after they have taken an enema to clear out barium containing feces, it is seen that the colon can be thoroughly cleared in this way.

Some surgeons still cling to pre-operative purgation because of fear of the absorption of toxins from fecal matter in the bowels. As a matter of fact, we know that there is much more likelihood of absorption from churned-up liquid contents than from dry feces lying quietly in the bowel, for as Karl Meyer shows, solid feces tend to restrain the growth, in the intestine, of pathogenic bacteria.

How many people feel miserable and poisoned for a few days after purgation!

Some men purge to avoid post-operative gas pains, fearing that fermenting intestinal contents is the cause of these pains.

Alvarez quotes Kaders' work which demonstrated comparatively little difference in gas accumulation in isolated loops of dog intestine, when one segment of gut was washed free with saline, and the other segment still contained fecal matter. Very little gas was found in either case unless the circulation was interfered with.

If the mesenteric arteries, or more particularly, if the veins were tied, the loop of gut soon became enormously distended. Therefore, the thing to be desired is not a clean bowel but a normal mesenteric circulation.

In many sensitive people purgation will be followed by alarming flatulence and distension. If this happens when the abdomen has not been opened, how much more likely is it to endanger life when

the bowel has suffered the added insults of handling, exposure and sewing?

Alvarez then reviews the literature and finds the basis for purgation back in the writings of the ancients. They believed that a physic "purged one of foul humours" and they (the ancients) prepared anyone for an ordeal by a preliminary purge. In the early days a surgical operation was an ordeal and consequently the patient must be purged before it.

But, adds Alvarez in commenting on this, if purgation "energizes the vital powers" why is it not employed by athletes? Why does not the college trainer give the track or football team a dose of salts the night before a contest?

Alvarez then reviews the results of his examination of the intestines of purged animals. Rabbits were used, mildly purged, some with castor oil, some with magnesium sulphate, some with cascara, some with calomel, and some with compound jalap. The animals were killed in twenty-one hours and segments of the bowel tested in warm oxygenated Ringers' solution. Some of the animals were apathetic and looked sick. Their bowels were injected, full of fluid and gas, sometimes atonic and flabby, sometimes irritable with a tendency here and there to contract into a hard white cord.

The excised segments when put into Ringers' solution showed weak irregular contractions and soon became fatigued. Furthermore, they were less sensitive to drugs applied locally; the dose of these drugs in some cases had to be increased 100 times to produce any effect.

This latter finding confirms the common experience of the difficulty in making the bowels respond to drugs after purgation. Magnesium sulphate seemed to be the worst, while calomel and cascara did not seem to fatigue or poison the bowel as much as any of the other purges.

The injection of the intestinal wall and the engorgement of the mesenteric vessels deserve mention, especially in the light of Kaders' work, previously referred to, in which interference with the mesenteric circulation caused enormous bowel distension.

The same injection and mesenteric engorgement has been observed in man. Experimental work has shown that the blood is capable of absorbing gases from the intestine, and excreting them through the lung. Venous stasis prevents this exchange.

The author concludes this excellent article with an outline for pre and post-operative care.

CHARLES N. HENSEL.

#### A VACCINE FOR THE TREATMENT OF BRONCHIAL ASTHMA: REPORT OF TWENTY CASES:

J. Morrison Hutchenson and S. W. Budd, (The Amer. Jour. of Med. Sciences, Vol. CLV., No. 6, June, 1918) point out that the work of Auer and Lewis, Meltzer, Vaughan, Babcock and others leaves little doubt that the disease so long known as bronchial or idopathic asthma has been permanently

removed etiologically from the neuroses, and is now fully explained as a manifestation of protein sensitization. The paroxysmal outbursts represent anaphylactic shock and the various causes formerly thought to act reflexly, and whose removal often resulted in cure, are now believed to be foci from which the foreign material necessary to induce an attack is elaborated.

Judging from the widely diversified nature of the exciting causes of asthmatic seizures it would seem probable that the specific poison either occurs in a number of forms or is common to a great variety of plants and animals as well as bacteria. Moreover, from our understanding of the conditions underlying sensitization it is evident that an immunity could be produced provided the specific protein was capable of being isolated in an available form and injected into the sensitized individual in suitable amounts and at proper intervals. This procedure, however, assuming that it was possible in more than a limited number of cases, would involve an amount of time and work far exceeding the means of the average sufferer from asthma.

Certain observations of the writers, derived from the study of a considerable number of cases of asthma, have strongly suggested the possibility of the presence of the specific protein in the bronchial secretions of the patient himself, and also that this protein may be recovered in suitable form for use in bringing about immunity.

The writers have used a vaccine in their series of cases prepared in the following manner: 1 c. c. of washed sputum is incubated in 10 c. c. of broth and 1 or 2 drops of guinea pig serum for a period of forty-eight hours. At the expiration of that time the culture is standardized and killed by heat of 60° C. for a period of two hours. Further decomposition is prevented by adding carbolic acid until a 1 per cent solution results. This is cultured out to ensure sterility of the suspension. The vaccine is then diluted with normal saline until each cubic centimeter of the suspension contains 500,000,000 to 1,000,000,000 organisms. The initial dose is 5 minims and each subsequent dose is increased by 1 minim. They do not increase beyond 15 minims, although they may continue the treatment several weeks after this amount has been reached.

The writers have been able so far to observe the effect of this plan of treatment in 20 cases of typical bronchial asthma.

In 12 of these cases complete relief from attacks was experienced after from one to five injections of the vaccine and this relief has persisted up to the present time. The longest period of freedom from symptoms is sixteen months, the shortest six weeks.

In 5 cases distinct improvement has been noted either in the frequency of the seizures, their severity, or their duration. In 3 of these cases improvement occurred only after a second vaccine had been made and administered at shorter intervals than the first.

In 2 cases no effect at all was produced. One of



these patients was an elderly man with emphysematous lungs and a history of asthma extending over twenty years. Asthma in the other case had followed injury to the chest and roentgen-ray examination revealed ununited fractures of several ribs.

In 1 case administration of the vaccine seemed to increase the intensity of the paroxysms, a result which appeared to be explained by the fact that too long a time was allowed to elapse between injections.

Injections have in most cases been made twice a week. The writers are of the opinion, however, that a shorter interval will prove more desirable. They have also attempted, in each case, to remove an obvious focus of infection, but have refrained from any other treatment while the vaccine was being used.

The writers have been greatly impressed by the above results and hope to determine in the near future (1) whether or not the elements constituting the mixture are effective if injected separately; (2) also which element is potent; (3) and whether the protein injected is specific or not.

E. T. F. RICHARDS.

## BOOK REVIEWS

**RECLAIMING THE MAIMED.** A Handbook of Physical Therapy. (By R. TAIT MCKENZIE, M. D., Major R. A. M. C., Professor of Physical Therapy, University of Pennsylvania. Illustrated. Published by The MacMillan Company, New York, 1918.)

This volume states briefly some of the conditions brought about by the present war, and further, outlines a few of the most important physical treatments employed in alleviating, relieving, or curing these conditions.

Among the most numerous and trying conditions studied may be mentioned:

1. Injury to peripheral nerves all the way from bruising of a nerve trunk to its destruction and restoration by surgical means.
2. Old septic wounds, long since healed, which frequently remain persistently painful, and which on careful examination show a focus of infection.
3. Post operative results and conditions completely cured only by physical means and methods.
4. Scar tissue appearing either in preparation for, or after the operation.
5. Functional neuroses, which take the form of palsies, contractures, loss of sight, speech or hearing; areas of anesthesia, hyperesthesia, etc., etc.
6. The conditions variously grouped under the name "Shell shock" which may vary all the way from minute hemorrhages into the brain substance, caused by concussion, to fear and intolerable weariness.
7. Soldier's heart, which is but a manifestation of overstrain thrown on this particular organ.
8. Debilitated states and conditions following the infectious diseases such as typhoid, dysentery, etc.

9. Sprains, fractures, flat feet, and other postural defects.

The means and methods employed in the physical treatment of the above mentioned conditions with varying degrees of success may be tabulated as follows:

1. Electricity.
  - a. Galvanic cell for wounds and scars.
  - b. Faradic coil, for muscle testing and exercise.
2. Radiant light and heat.
  - a. Heliotherapy, for local and general conditions.
  - b. Electric arc lamp.
  - c. Local electric light bath.
  - d. Full electric light bath.
  - e. Steam compresses (electrothermophore, hot water bags, hot salt or sand bags).
3. Hydrotherapy.
  - a. The douche.
  - b. Immersion bath.
  - c. Local bath.
  - d. Electric bath.
  - e. Medicated bath.
  - f. Contrast bath.
4. Massage and passive movements.
5. Active movements and re-education of stumps, artificial limbs, or mechanical devices.
6. Gymnastics and games including in minute detail the introductory, general, and final exercises.
7. Treatment by occupation.

These measures of treatment, it is true, in the past have been used almost exclusively only by a few enthusiasts in the profession or by those who entered it chiefly without civil sanction or professional recognition. Peaceful life created but a few wounds as compared with the great number that are being produced daily by the present war methods, and, therefore, the condition demanding the foregoing treatment was an exception. This exception, as all exceptions in any place, did not receive the proper mental concentration and medical application from the profession as a whole, but was treated, however, very intelligently by the few who were either by choice or necessity interested in industrial wounds and injuries. The abuses, then again, have been so numerous when applied indiscriminately to any condition that it soon fell into the deep channels of disrepute. We see, therefore, that the scarcity of the conditions and the abuses of the treatment for these conditions were the most potent factors in underestimating and delaying investigation of these healing procedures. Now that the war has produced hundreds of wounds, states, and conditions, demanding such treatment, it has been quickly recognized as most valuable and is being properly administered in most of the war hospitals. After the war is over thousands of these patients shall be discharged from the military bases and will then depend solely upon the quiet practitioner for further treatment. The sooner we realize that these ailments will remain with us for at least

a whole generation, and, the sooner we thoroughly investigate the means and methods of combating them, the better will we be able to fulfill the additional duties arising from the world-wide conflict.

This little book is, then, nothing more or less than a pleasant precursor of the great evolution in our generation in the treatment of the greatly varying conditions growing out of the present conflict, and should, therefore, receive a warm welcome in the library of every practitioner.

J. A. LEPAK.

**ROENTGEN DIAGNOSIS OF DISEASES OF THE HEAD.** (By DR. ARTHUR SCHULLER, Head of the Clinic for Nervous Diseases at the Franz Joseph Ambulatorium, Vienna. Authorized Translation by FRED F. STOCKING, M. D., M. R. C.; With a Foreword by ERNEST SACHS, M. D., Associate Professor of Surgery in Washington University. Published by C. V. Mosby Company, St. Louis, 1918. Price \$4.00.)

This is a belated and much to be desired English translation of the only truly comprehensive work upon this subject which has yet been offered to the profession. From the standpoint of print-craft it is a great improvement upon the German edition and the translation leaves nothing to be desired in clearness of diction or accuracy of interpretation.

The author has long been recognized among roentgenologists as the authority par excellence upon this subject, the breadth of his experience probably being unequalled by that of any other man in the world.

The chapter devoted to the recognition of intracranial diseases by a study of the changes produced in the skull is of special interest. The subject is discussed under the following headings:

Local Destruction of the Skull.

Group 1. Tumors of the Hypophysis.

- (a) In Acromegaly.
- (b) In Dystrophia Adiposo-genitalis.
- (c) Without Symptoms of Trophic Disturbance.

Group 2. Acoustic Tumors.

- (a) With Pathognomonic Change of the Dorsum.
- (b) With Erosion of the Sella.
- (c) With General Pressure Atrophy of the Inner Surface of the Skull.

Group 3. Tumors of the Base of the Brain.

Group 4. Tumors of the Convexity of the Brain.

Skull Changes in Consequence of Chronic Excessive Intracranial Pressure.

- (a) General Erosion.
- (b) Suture Changes.
- (c) Widening of Venous Canals.
- (d) Skull Thickening.

Roentgen findings in Epilepsy, Cerebral Infantile Paralysis, Idiocy, Psychosis and Migraine.

Under Diseases of the Skull, there is a chapter of 120 full pages which makes fascinating reading and offers little to criticize. There is another chapter which considers the normal skull in all the variations in which it appears in the roentgenogram. The numerous roentgenograms illustrating the book seem

to lack the technical excellence of those of our better American roentgenologists, but their marvelous variety more than compensates for this minor deficiency.

The book should be in the library of every internist and neurologist and even the general practitioner would find it of much value and interest.

FRANK S. BISSELL.

**GENITO-URINARY DISEASES AND SYPHILIS.**

(By HENRY H. MORTON, M. D., F. A. C. S., Clinical Professor of Genito-Urinary Diseases in the Long Island College Hospital; Genito-Urinary Surgeon to the Long Island and Kings County Hospitals, Etc. Fourth Edition Revised and Enlarged with 330 Illustrations and 36 Full-page Colored Plates. Published by C. V. Mosby Co., St. Louis, 1918.)

The fourth edition of Morton's Genito-Urinary Diseases and Syphilis has been brought up to date and is now an exhaustive work on diseases of the male genito-urinary system.

There are no particular features that stand out in this work. The text is clear and concise, but a bit impersonal. The illustrations are good, excepting the colored ones found in the section on syphilis which do not portray the essential features of the syphilides, which they illustrate, nearly as well as the half tones shown.

On the whole, the book can be considered a first-class text and its general make-up a big advance over previous editions.

HENRY E. MICHELSON.

**INTERNATIONAL CLINICS.** (By leading members of the medical profession throughout the world. Vol. II., 28th Series, 1918. Published by J. B. Lippencott Company, Philadelphia and London.)

This volume is of special merit in that it contains several articles of interest. The article, "A General Consideration of Pancreatitis", by Dr. E. W. Archibald, is especially worth reading by everyone interested in abdominal diagnosis.

Neurological surgery is explained by Dr. Dean Lewis, and comprehensive and instructive cases are cited.

There are several other articles also worthy of mention, which go to make up a volume well worth reviewing.

W. C. CARROLL.

**THE SURGICAL CLINICS OF CHICAGO.** (By various authors. Vol. 2; No. 3. With 63 Illustrations. June, 1918. Published Bi-Monthly by W. B. Saunders Company, Philadelphia and London.)

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